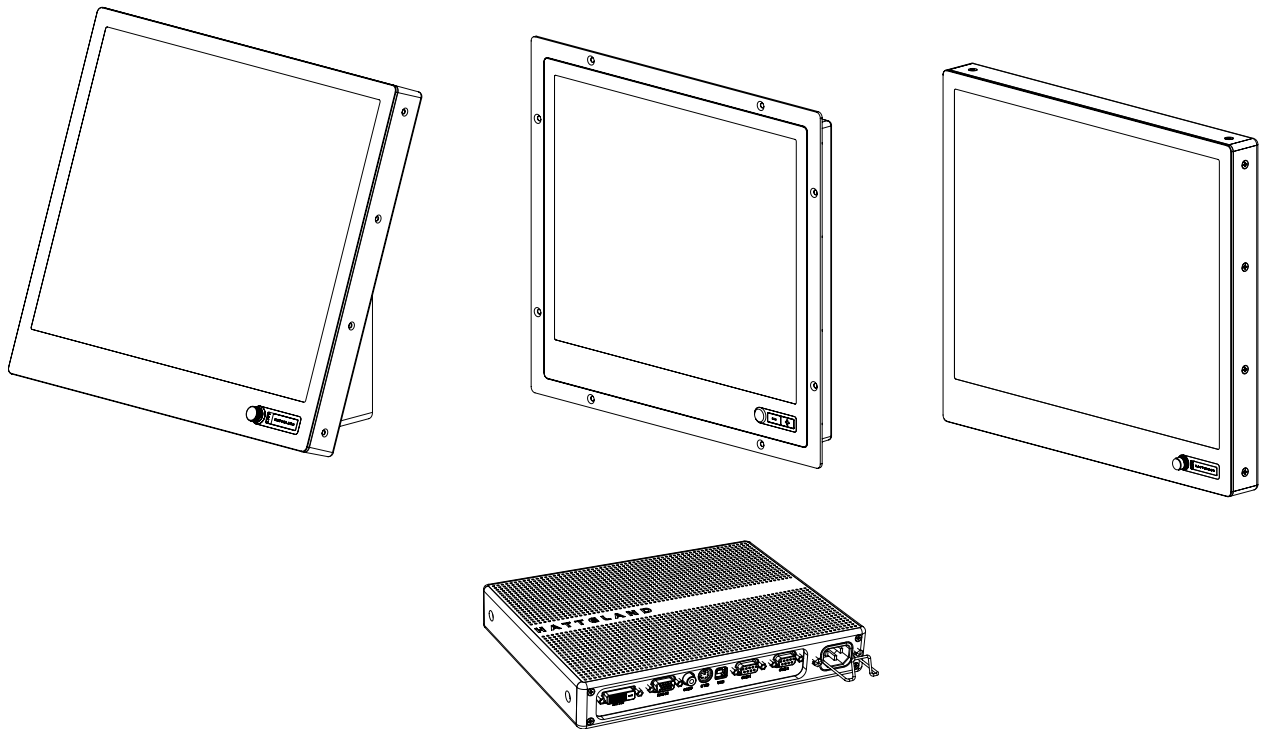


USER MANUAL



Series 2 - Displays and Backpack range

HD 12T04 xxxx - 12.1 inch Display

HD 15T06 xxxx - 15.0 inch Display

HD 19T03 xxxx - 19.0 inch Display

HD MMD01 xxx - Maritime Multi Display Backpack

User Manual MMD Series 2

Updated: 22 Nov 2007

Doc Id: INB100026-1 (Rev 9)

For models:

BOAA, BOBA, FOAA, FOBA, COAA, COBA (standard models)

BOAC, BOBC, FOAC, FOBC, COAC, COBC (with touch screen)

MMD01-Ax1, MMD01-Ax2 (AC and DC)

MMD01-Cx1, MMD01-Cx2 (AC and DC + touch support)

Please visit our website for the latest electronic version of this manual.

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Aamsosen, N-5578 Nedre Vats, Norway

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All other product names or trademarks are properties of their respective owners !

WARNING: This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

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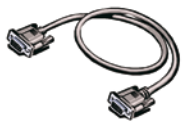
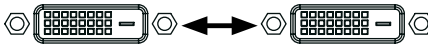
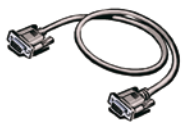
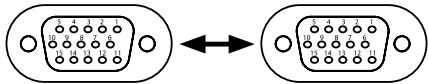

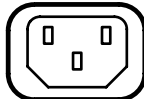




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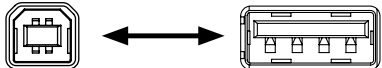
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Contents of package

This product is shipped with:

Item	Description	Illustration
	1 pcs of Standard DVI Signal Cable. DVI-D 24P Male to DVI-D 24P Male - Length 1.8m	
	1 pcs of Standard VGA Signal Cable DSUB 15P Male to DSUB 15P Male - Length 1.8m	
	1 pcs of Standard Power Cable . (European Type F “Schuko” or US Type B standard plug) Length 1.5m <i>Note: Power cable(s) not included in the DC version.</i>	
	1 pcs of DVI-I > RGB/VGA adapter DVI-I 24P Male to DSUB 15P Female	
	1 pcs of User Manual	
	1 pcs of Series 2 Bracket stand. <i>Note: Only supplied with the Bracket version of the complete unit (display unit + backpack unit). This bracket is factory premounted.</i>	

Optional Contents of Package:

Item	Description	Illustration
	1 pcs of Standard USB Cable TYPE B to TYPE A - Length approx: 1.5m <i>Note: This cable is only included if you purchased a product with factory mounted touchscreen.</i>	

General

Hatteland Display AS

KNOWLEDGE - QUALITY - VALUE

Introduction to Hatteland Display AS

Founded in 1987, Hatteland Display offers the widest range of type approved marine monitors, panel computers and type approved marine computers for the worldwide commercial, naval, yacht and cruise market.

Today the group develops and manufactures a complete range of IEC 60945 tested marine monitors, panel computers and IEC 60945 tested marine computers.

“Design meets Functionality” - Series 2

ATTRACTION is more than just to show a nice picture on a screen. The new IEC60945 tested man-machine interfaces, offered by Hatteland Display AS, will fulfill the customers wish for outstanding design combined with the reliability of approved maritime Panel-Computers and Displays.

These IP rated products are meant to be usable in all maritime applications. By the proven optical bonding technology, the Panel Computers and Displays show drastically reduced reflection and enhanced optical performance. This truly allows inside or outside use of these products.

Cool is not only the design, but also the product by intelligent heat dissipation and reduced heating storage. Using state-of-the-art components such as LCD-TFT Modules and ETX-PC bases industrial computers, long-term availability and serviceability is secured.

Flexibility in application and service friendliness is achieved by a unique backpack solution, whereas the detachable backpack contains the “intelligence” of the product.

The extreme small form factor used on this product line with a general depth of only 75mm (!) and for example for the 19in with 416 (W) x 372 (H) mm, allows new-builds and retrofit installation almost everywhere.

The flush mounted glass front shows only what is necessary: the content of the picture. The frameless design can smoothly be integrated into a console or it can be used as table mounted device (bracket version). A console version are also available for installment on flybridges with IP66 rating.

This new HATTELAND® Series 2 Panel Computers MMC2 and Displays MMD2 will be available from Q2 2006 onwards in 12in., 15in. and 19in. sizes. The concept allows easy scaling in sizes from small LCD screens up to large sizes of more than 32in LCD wide-screens. This outstanding and affordable product range offers a wide choice for different needs.

Optical Technology

With the Optical Bonding technology - where the space between the front glass and the TFT module is filled with a special substance, the bonded products offers the best sunlight viewing of any marine displays today. Sunlight reflection has been drastically reduced and the inclusion of a 0-100% backlight ensures the screen can be viewed with excellent clarity, day or night. The bonding process also has another benefits; with no space for heat and moisture to collect in the display, and also they does not suffer from condensation, also known as misting.

Approved Marine Displays (MMD/STD) - Series 1

Hatteland Display's marine monitors are based on high quality and state-of-the-art components with the highest specifications, and meet all requirements for harsh maritime use. The displays are easily integrated into your system, due to standardized products and features.

The MMD (Maritime Multi Display) series consists of sizes ranging from 10in to 23in.

Specifically designed for navigation and automation systems on ships, these certified LCD monitors comply to IP66 described in IEC 60925, are tested according to IEC 60945 and are approved by major classification societies such as ABS, BV, ClassNK, DNV, GL and LR. Further to this marine standard, the 19in MMD, the 20in MMD and the 23in MMD marine monitors are also available as ECDIS and ARPA radar-compliant units.

Hatteland Display AS

Approved Marine Panel Computers (MMC) - Series 1

The combination of the reliable design of the marine TFT-LCD modules, together with industrial computer boards, allows Hatteland Display to offer a product range for customer applications where space is critical and full function is desired in a single unit. In particular, the standardized ETX-board form factor allows full flexibility when it comes to processor choice. Because of multiple useful standard components we can offer a highly attractive commercial package

The MMC (Maritime Multi Computer) series consist of sizes ranging from 10in to 23in.

These products have also been designed for typical marine applications in navigation, automation and other systems. Following Hatteland's philosophy, these marine panel computers are fully tested according to IEC 60945 and are designed for type approval.

Approved stand-alone and rack-mounted marine computers

Two concepts are followed to offer variation in size, function and expansion slots for customers: approved black-box computers for limited space and approved computers for standard 19in racks, which offer a high degree of expansion. Configurations according to customer wishes are implicit, such as the operating system, CD-burner, RAM, graphic card, HD, add-on cards, factory installed software and many, many more.

The approved computers are tested according to IEC 60945 and IACS E10 and meet the requirements for IEC 61174 (ECDIS). Several approvals by major classification societies such as ABS, BV, ClassNK, DNV, GL and LR are available or pending.

Flexible display solutions and night vision facilities

All Type Approved displays, panel computers and marine computers provide maximum flexibility for customer applications. We offers all products with AC or DC power supply, and marine displays and marine panel computers have a fully linear dimmable function for night vision.

Upon customer request, specific color, mechanical and electrical function designs can be implemented. Many more options are also available such as, sun visors, mounting brackets, different Windows or Linux operating systems and touch screens. All products are designed and manufactured in Nedre Vats, Norway. The production and configuration of all products takes place within Hatteland's high capacity production plant#1 (opened in September 2003) in Nedre Vats, Norway.

Hatteland's production facilities are designed for future expansion, which has enabled the creation of plant#2, our Optical Technology facility, opened in October 2006. The chosen materials for the production of our products are high grade industrial components able to fulfil form, fit and function requests.

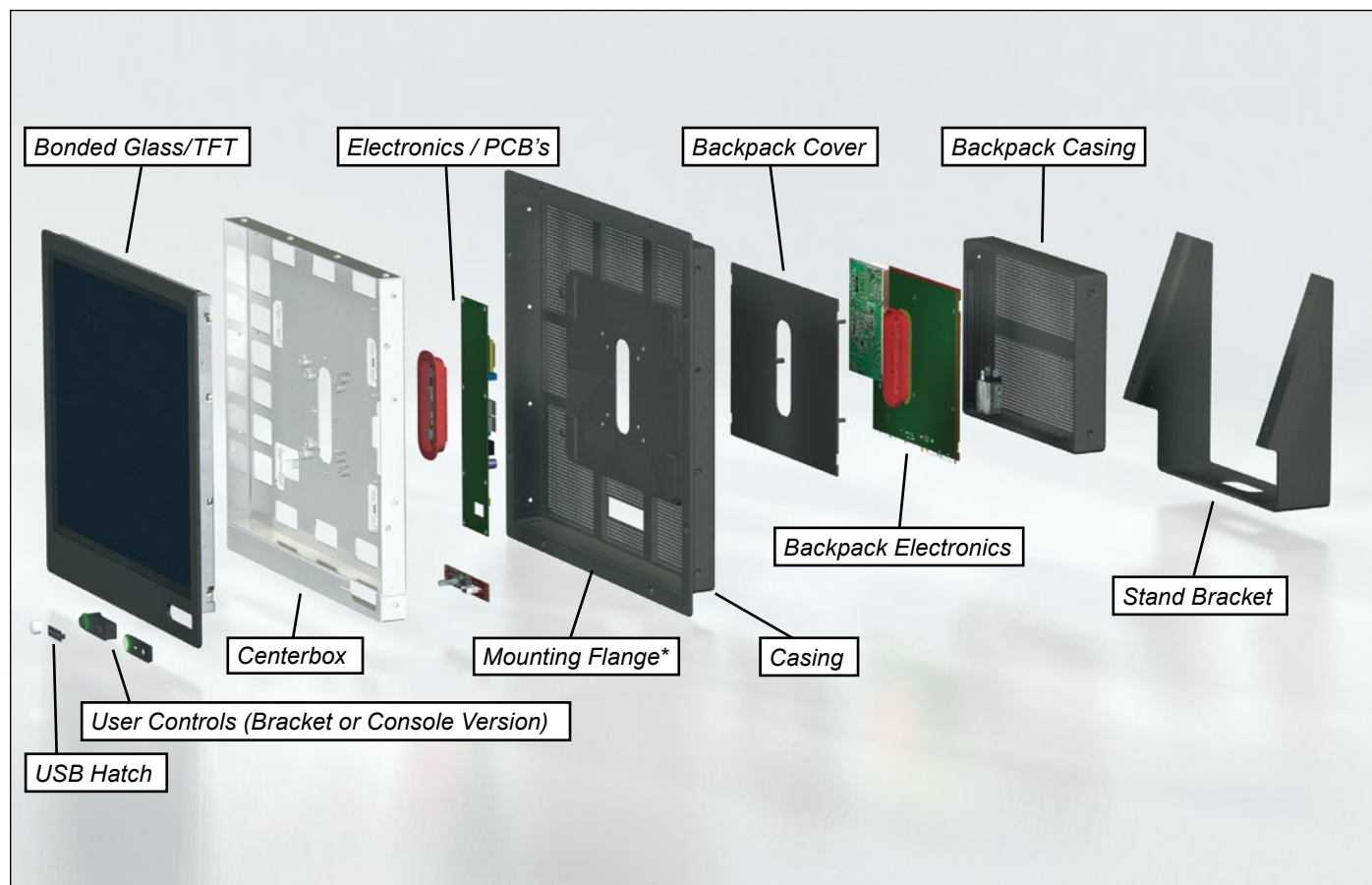
About this manual

The manual contains electrical, mechanical and input/output signal specifications. All specifications in this manual, due to manufacturing, new revisions and approvals, are subject to change without notice. However, the last update and revision of this manual are shown both on the frontpage and also in the "Revision History" chapter. Please use that as a reference.

Furthermore, for third party datasheet and user manuals, please see dedicated interactive CD (where included) delivered with the product or contact our sales personnel for support. Please see the Contents Of Package chapter in the beginning of this manual to determine if a dedicated manual CD are included.

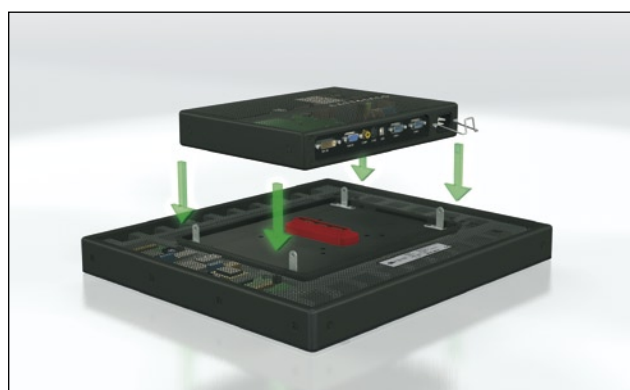
Basic Construction - Series 2

Basic Construction - Series 2

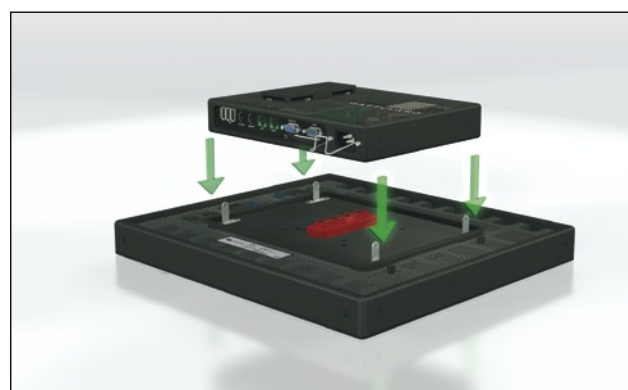


*Available with or without flange (factory default deliverance)

Modular Backpack Concept - Series 2



Display and MMD2 (Display) Backpack



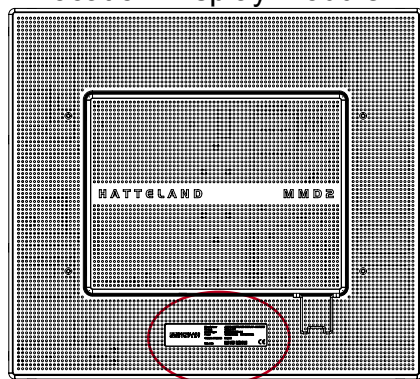
Display and MMC2 (Computer) Backpack

Product Labels (Examples)

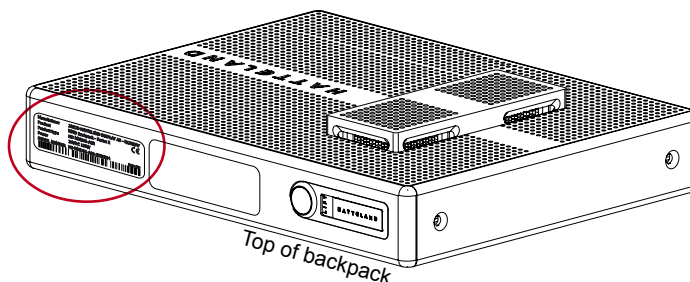
Serial Number Labels Placement

The Series 2 products are based on a modular backpack concept, which allows users to easily change the functionality. Both the display modules and the backpack modules are by factory default labelled with unique labels. These are located as illustrated below.

Location Display Module:

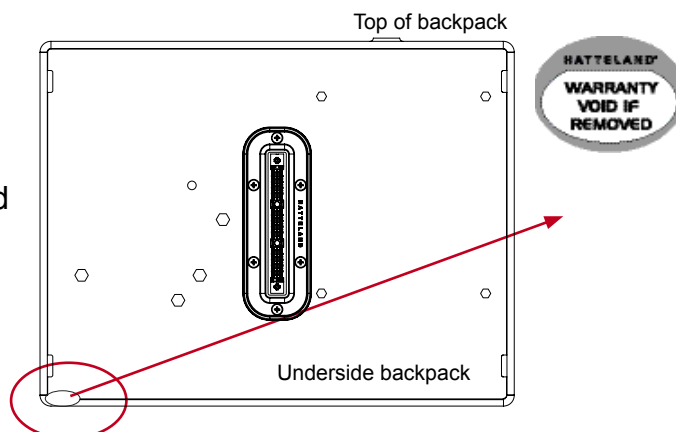


Location Backpack Module:



Warranty Label

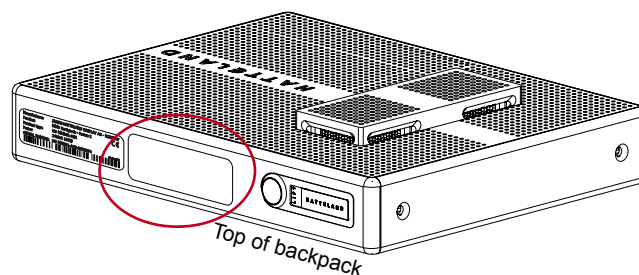
If you are to perform service on a unit still under warranty, any warranty will be void if this label is attempted removed / re-glued or removed completely. This label is located on the product as shown in illustration.



Windows® OEM Certificate of Authenticity (COA)

Applies for products after JAN/FEB 2007.

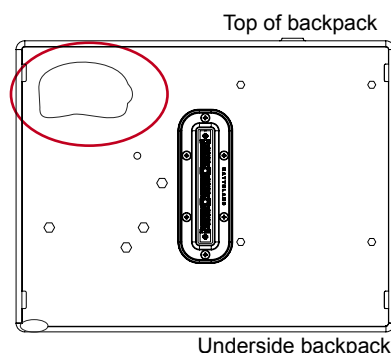
On the Series 2 MMC (computer backpack), a COA label for the operating system license is placed as shown in illustration.



Windows® OEM Certificate of Authenticity (COA)

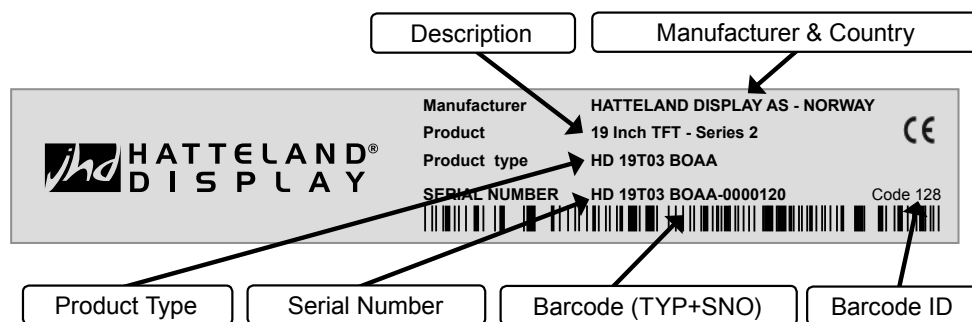
Applies for products produced before FEB 2007.

On the Series 2 MMC (computer backpack), a COA label for the operating system license is placed as shown in illustration.

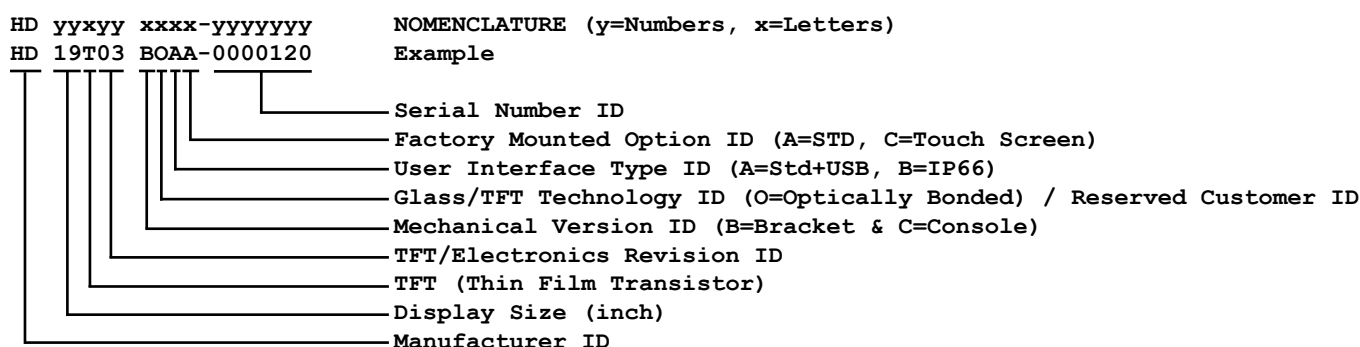


Product Labels (Example)

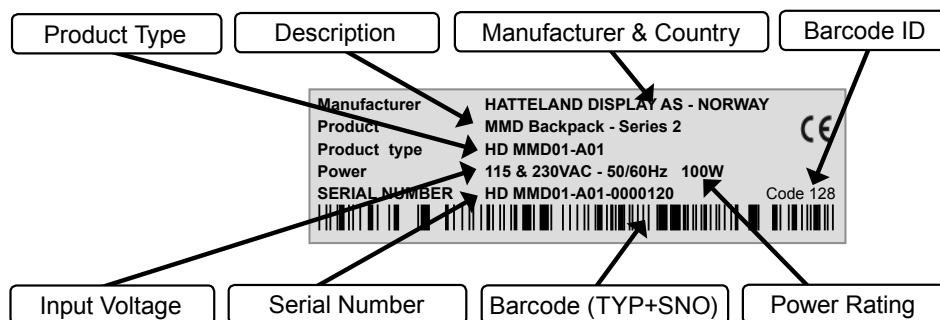
Serial Number Label Layout (Display Module)



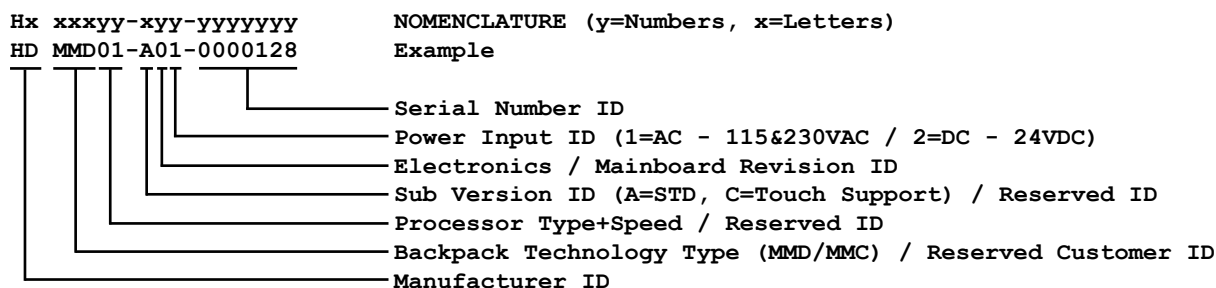
Serial Number Label Nomenclature (TFT Module)



Serial Number Label Layout (Backpack Module)



Serial Number Label Nomenclature



Touchscreen products

Introduction to products with touchscreen

Both Resistive and Capacitive touchscreen solutions are used for our products. Please visit our website to find your exact type number and then determine if it uses Resistive or Capacitive. If you have a customized or tailored product, please check the specifications in this manual or third-party specifications from your supplier.

Capacitive Touchscreen

Capacitive touchscreens operate using oscillator circuits that are located in each corner of the glass overlay and measure the capacitance of the area to be “touched”. Depending on where the user touches the overlay, the oscillators will vary in frequency. A touchscreen controller then measures the frequency variations to ascertain the coordinates of the person’s touch. This glass overlay has a coating that stores the charge deposited over its surface electrically. It will not operate with either a gloved hand or with a mechanical stylus.

CAPACITIVE - Brief Specifications

Subject	Details
Construction	Top: ClearTek protective overcoat protects the sensors and increase durability. Inside: Electrode X/Y grid pattern and conductive coating. Bottom: Glass and conductive coating. Small amount of voltage is applied to the four corners for measuring X and Y coordinates of the touch point.
Positional Accuracy	Reported touch coordinates are within 1.0% of true position. (Based on viewing area dimensions)
Touch Contact Requirements	3 ms for finger input.
Endurance Tested	More than 225 million touches in one location without noticable degradation to the surface.
Cleaning	Water, isopropyl, alcohol, and similar non-abrasive cleaners.
Liquid Resistance	Liquids on screen does not impede touchscreen performance.
Light Transmission	Up to 88% at 550 nm; dependant on specific surface finish chosen.

Resistive Touchscreen

It generally uses a display overlay composed of layers, each with a conductive coating on the interior surface. Special separator “dots” are distributed evenly across the active area and separate the conductive interior layers. The pressure from using either a mechanical stylus or finger produces an internal electrical contact at the “action point” which supplies the controller with vertical and horizontal analog voltages for data input. The resistive touchscreens are anti-glare to reduce reflective shine intensity, which will slightly diffuse the light output throughout the screen. Resistive technology activation can be initiated by; a gloved hand, fingernail, mechanical stylus or an ungloved finger.

RESISTIVE - Brief Specifications

Subject	Details
Construction	Top: Polyester with outside hard-surface coating with clear or anti-glare finish. Inside: Transparent conductive coating. Bottom: Glass substrate with uniform conductive coating. Top and bottom layers separated by separator dots.
Positional Accuracy	Standard deviation of error is less than +/- 0.080-inch (2mm).
Touch Activation Force	Typically 57 to 133 g
Expected Life Performance	More than 35 million touches in one location without failure, using a stylus similar to a finger.
Chemical Resistance (Exposed for one hour)	Acetone, Ammonia-based glass cleaners, Common food and beverages, Hexane, Isopropyl alcohol, Methylene chloride, Methyl ethyl ketone, Mineral spirits, Turpentine
Light Transmission	Typically 75% over visible light spectrum.

Touchscreen products

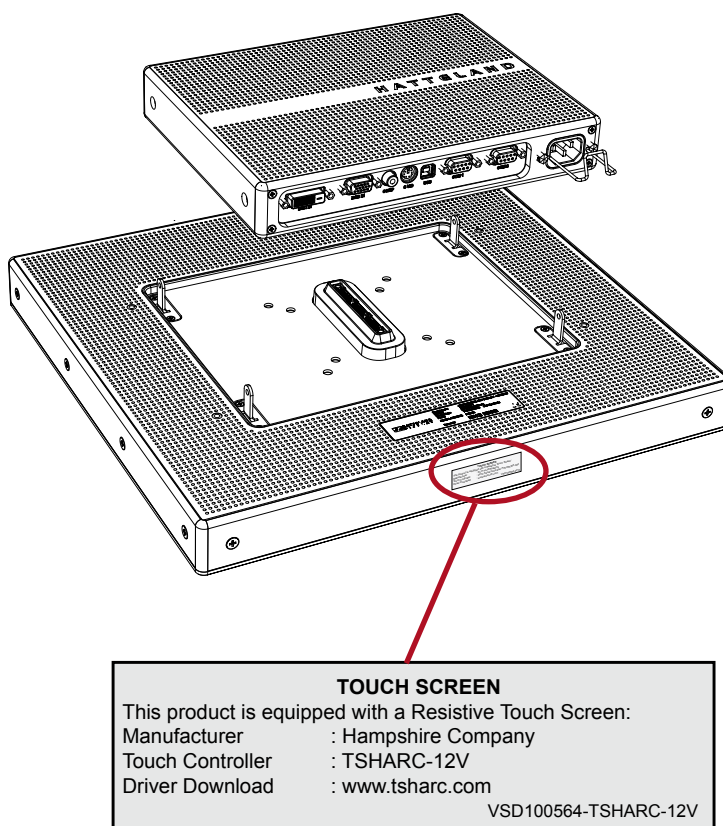
Location of Touchscreen label

Information about the factory mounted touchscreen and what driver to use, are indicated on the dedicated label. The location is shown in this illustration together with label example. We use the same touchscreen glass technology and controller technology on all the Series 2 products.

(This label is attached on products produced after September 2006)

If this label is not present, the type numbers can be identified to indicate mounted touchscreen.

Example: HD 19T03 BOA**C** & HD MMD01-**C**01 (Underlined and in bold indicates **C** as touchscreen models)
 || Displaymodule || || Backpack ||



Actual label on Series 2 products

Up-2-date touchscreen drivers and documentation:

Please visit the 3rd party website as indicated on the label. You can also visit our website www.hatteland-display.com to view the full list of our models with touchscreen. Before using the touchscreen, it should be calibrated for your system. Please install the 3rd party software and use the Calibrate function from there.

Installation

General Installation Recommendations

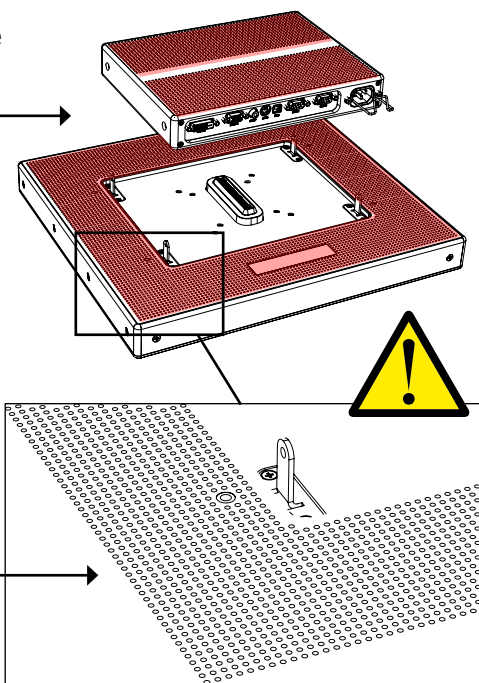
Installation and mounting

1. Most of our units are intended for various methods of installation or mounting (panel mounting, bracket mounting, ceiling/wall mounting etc.); for details, please see the relevant mechanical drawings.

2. Adequate ventilation is a necessary prerequisite for the life of the unit. The ventilation apertures (*red/gray area shown in the illustration to the right*) must definitely be kept clear.

The Series 2 units was designed to be fan less, and covering up the ventilation apertures (*shown in closeup chassis below*) is not permissable, doing so can lead to overheating and could damage the unit.

Suggested and a safe minimum air distance between the ventilation apertures and other panels near the unit should be 5cm. However, this can be lower or higher depending on the installation space and design. If in question, please contact your local installation technician or qualified personell for advise!



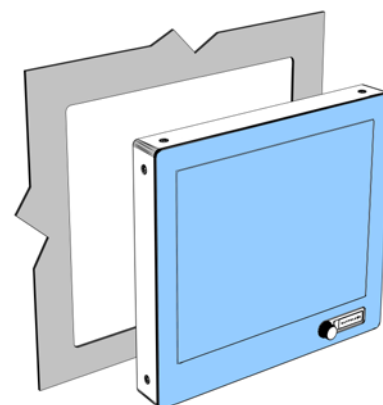
3. Generally, do not install the unit in a horizontal position (laying down), as this will cause heat to build up inside the display which will damage the LCD Panel. To prevent this problem we recommend installing the unit in a vertical position (± 40 degrees) to improve the airflow through the unit.
4. To further improve the cooling of the unit we recommend installing Cooling Fans underneath blowing upwards going past the ventilation apertures. This may be required in high temperature applications and also when there is reason to expect temperature problems due to non-optimal way of mounting.
5. Exposure to extreme direct sunlight condition over longer periods can cause a considerable increase in the temperature of the unit, and might under certain circumstances lead to overtemperature. This point should already be taken into consideration when the bridge equipment is being planned (sun shades, distance from the windows, ventilation, etc.)
6. Space necessary for ventilation, for cable inlets, for the operating procedures and for maintenance, must be provided.
7. Information about necessary pull-relievers for cables is given in the installation drawings. Attention must be paid to this information so that cable breaks will not occur, e.g. during service work.
8. Do not paint the product. The surface treatment influences on the excess heat transfer. Painting, labels or other surface treatments that differ from the factory default, might cause overheating.

General Installation Recommendations

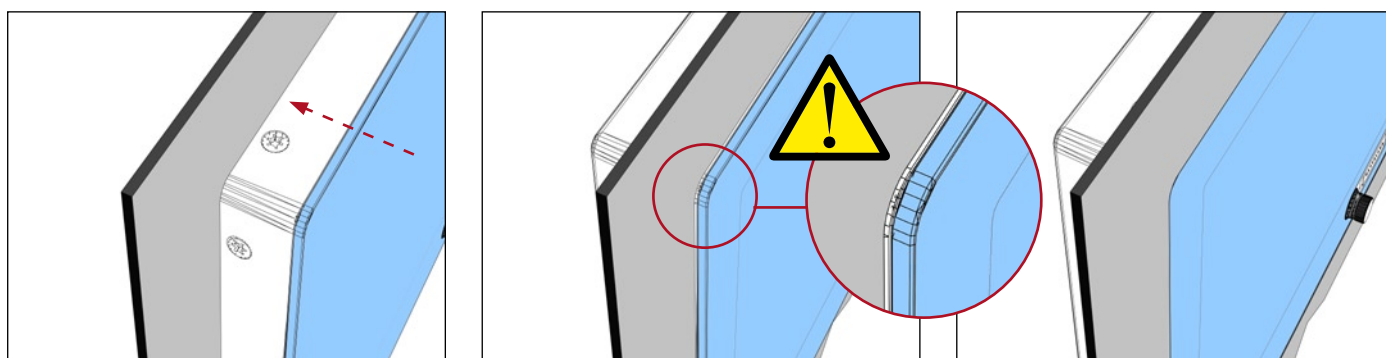
Panel cut-out mounting precaution

If you intend to mount the bracket / stand-alone product into a pre-cut panel, make sure you have read and understood the following section. The Series 2 frameless design means that the front glass reaches all the way to the outer rims of the product.

Further, between the product chassis and the backside of the glass there is a small gap which is filled with a gasket. This little gap is subject of being “hooked” into the cut-out area edge if it is really tight and you mount the product hasty. Also, if your panel cut-out have small deviations you can accidentally break the glass edges.



Try to slide the product gently straight forward and avoid skewing the product. Do not force the product into place. If you find yourself in this position and notice that the back of the glass edge is forced forward by the panel cut-out edges or you suspect a pressure building up, remove the product, carefully modify the panel cut-out and check the dimensions again. The product can not be adjusted / modified in any way. The modification/adjustment has to be performed on the cut-out.



1: Start sliding the product into the cut-out area 2: Continue to slide, while checking the corners 3: Glass edge now aligned. Fasten the product.

Ergonomics

1. The product glass is covered by a clear protective plastic film. After installation & mounting is completed, remove this film by lifting it at a corner, and slowly peeling it off the glass.

The front surface of the display glass has an anti-reflective (AR) coating which can be scratched and damaged with improper cleaning. After removing the protective film the glass surface will require cleaning. It is recommended to use only 90+% pure Isopropyl alcohol (Isopropanol) and a soft fabric cloth for this first cleaning. Fold a cloth into a small pad, dampen the cloth with alcohol, and wipe the glass from one edge to the other in one direction with one continuous motion.

The product glass will require cleaning as needed. The soft cloth & alcohol wipe is recommended to clean fingerprints and oils off the glass. Water stains (including coffee, tea & coke) should be first cleaned off the glass with a soft fabric cloth wet with water, immediately followed with wiping using an alcohol wetted cloth.

General Installation Recommendations

2. Adjust the unit height so that the top of the screen is at or below eye level. Your eyes should look slightly downwards when viewing the middle of the screen.
3. Adjust screen inclination to remain gaze angle to the centre of the screen approximately perpendicular to the line of gaze.
4. When products are to be operated both from a sitting position and from a standing position, a screen inclination of about 30° to 40° (from a vertical plane) has turned out to be favourable.
5. Series 2 are optically enhanced to reduce reflections and are viewable in direct sun light, but as a general rule the units at the bridge wing area is recommended to be installed or mounted by suitable alignment or bulkhead / deckhead mounting in such a way that reflections of light from the front pane of the display are not directed into the observer's viewing direction.
6. The use of ordinary commercial filter plates or filter films is not permitted for items of equipment that require approval (by optical effects, "aids" of that kind can suppress small radar targets).

General mounting instructions

- The useful life of the components of all Electronics Units generally decreases with increasing ambient temperature; it is therefore advisable to install such units in air-conditioned rooms. If there are no such facilities these rooms must at least be dry, adequately ventilated and kept at a suitable temperature.
- With most Electronic Units, cooling takes place via the surface of the casing.
- In the area of the wheel house, the distance of each electronics unit from the magnetic standard compass or the magnetic steering compass must not be less than the permitted magnetic protection distance.

This distance is measured from the centre of the magnetic system of the compass to the nearest point on the corresponding unit concerned.

- Units which are to be used on the bridge wing must be installed inside the "wing control console" protected against the weather. In order to avoid misting of the viewing screen, a 25 ... 50 W console-heating (power depending on the volume) is recommended.
- When selecting the site of a display unit, the maximum cable lengths have to be considered.
- Transportation damage, even if apparently insignificant at first glance, must immediately be examined and be reported to the freight carrier. The moment of setting-to-work of the equipment is too late, not only for reporting the damage but also for the supply of replacements.

General Installation Recommendations

Cables

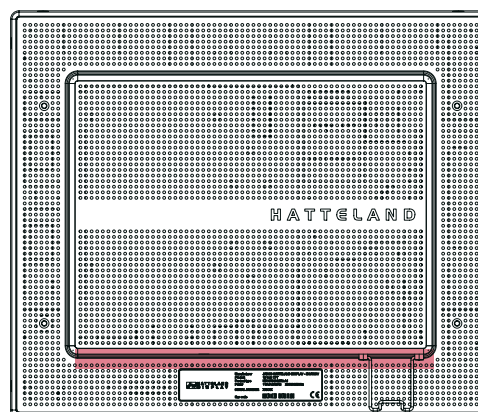
Use only high quality shielded signal cables for RGB / DVI signals.

Cable Entries & Connectors (Marked area) - Illustration only

Bottom View



Back View



Maximum Cable Length

The signal cables should generally be kept as short as possible to provide a high quality output on the display. The maximum cable length will depend on the signal resolution and frequency, but also on the quality of the signal output from the computer. Recommended refresh rate is 60Hz.

Cables up to 10 meters generally provides good picture quality even with a 1600x1200 (UXGA) 60Hz signal. In most cases (especially with lower resolutions) even longer cables will provide a satisfactory result. This should however be tested in advance before making the decision on how far the unit can be placed from the signal source.

Backpack / Bracket Replace / Removal - Series 2

How to change functionality / replace backpacks or remove bracket from product.

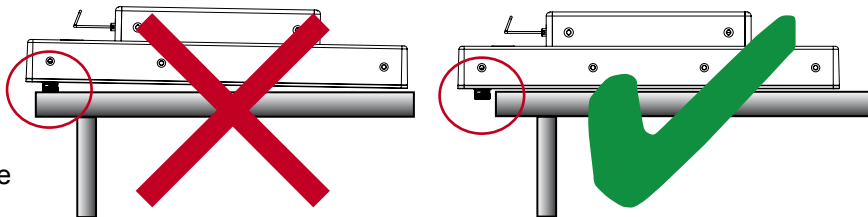
The Series 2 products are based on a modular backpack concept, which allows users to easily change the functionality. To change the functionality of your product from a display product to operate as a computer product or vice versa for example, please follow this procedure.

Note: Please review the corresponding manual for your backpack on how to operate your Series 2 product.

Also review the serial number label on the backpack. These labels have information regarding the power input.

Note: Ignoring the warnings we have provided with the  icon, will be subject for warranty void.

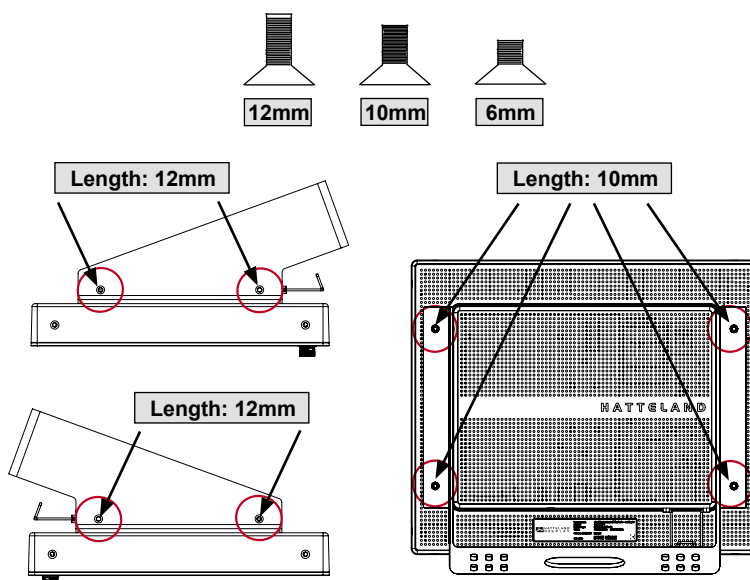
- 1:** Turn the power off and remove all cables. Place the product as indicated on a table. Make sure the display glass is protected! The navigator control should be free of any obstruction. Do not move the product on the table while its in this position, as this will scratch and damage the glass.



- 2: With bracket:** Remove all 8 screws as shown. Note: On 12inch there is only 4 screws (4x12mm) (*DIN 965 Torx A4 Black*) located on the product.

Do NOT mount/dismount the bracket/backpack when the product is in a upright/stand position. Place it as shown in step 1 above.

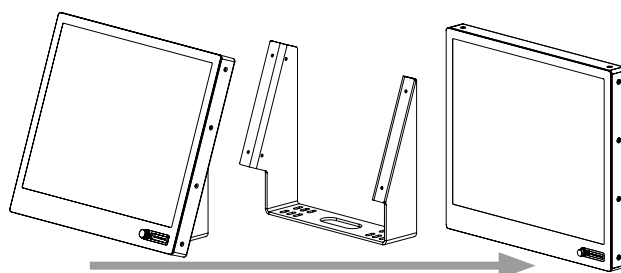
Notice where the different lengths of screws are located. Failure to remount the screws back to their original factory location may cause the bracket to loose it's strength and/or stability.



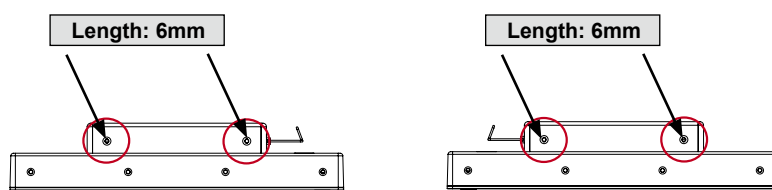
Bracket Removal

If you wish to use the Series 2 product without the factory mounted bracket, remove all 8 screws (4x10mm and 4x12mm) (*DIN 965 Torx A4 Black*) as shown in step 2 above. Now, leave the backpack in place and fasten it to the display module using 4x6mm screws as shown in illustration (step 3) below.

DO NOT EXCEED THE LENGTH OF 4x6mm WHEN MOUNTING/REMOVING THE BACKPACK TO THE DISPLAY MODULE.



- 3: Without bracket:** Remove 4 screws only. 4x6mm.

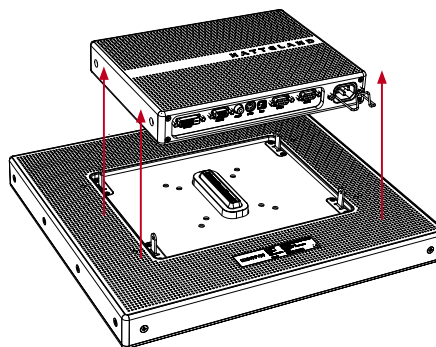


Backpack / Bracket Replace / Removal - Series 2

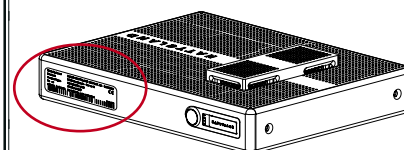
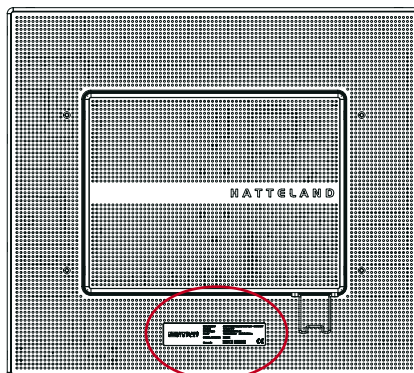
- 4: Lift the backpack gently with both hands upwards from the display module. Now change backpack and repeat steps 3-2 above in reverse.



Again note the length of the screws and their locations as shown in the previous steps.



- 5: Note serial numbers of backpack AND the main display module. The serial numbers are located on the labels. Like:
HD MMD01-A01-0000128 (Backpack)
HD 19T03 BOAA-0000120 (Display module)



- 6: The HATTELAND® Series 2 products are shipped mounted and fully operational with a customized combination of display unit and backpack unit. The two serial numbers are linked and registered by Hatteland, and together constitute an important basis for future customer service, quality records and technology improvements.



IMPORTANT: Hatteland Display provides normal warranty after any changes of backpack / display module combinations, when changes are made according to this manual AND when information of serial numbers after such changes are reported back to the Hatteland Display service department.

The following information should be returned to Hatteland Display AS, attn: Service Department:

- Customer / end-user name and address
- Date of change
- Serialnumber of display module.
- Serialnumber of backpack module.
- Serialnumber of replaced module (display or backpack).



If several units are reported, note which units are mounted together.

- 7: For the MMD backpacks you must SETUP DDC (Display Data Channel) to reset/optimize image information. It allows the display to send its specifications to the display controller.

For more information on how to use the On Screen Display (OSD) menu, please review the "OPERATION" chapter in this manual first. Reconnect power to the product and turn it on. Enter the OSD menu and navigate your way through the "Utilities / Load Default" submenu. (FIG 1)

FIG 1

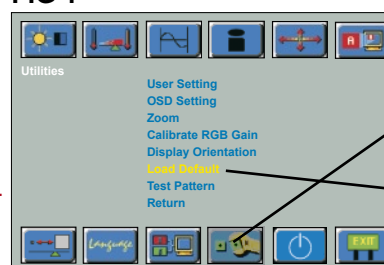


FIG 2

Navigate down to SETUP DDC and execute it. (FIG 2)

A message "Press MENU to Setup DDC" will appear. Press the navigator button/knob to execute.

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Operation Series 2 Products

User Controls

NAVIGATOR OVERVIEW - Maritime Multi Display (MMD):

The product features a multi functional user control via the navigator rotary & push knob with 8 independent LEDs for multiple feedback on different status/modes that may occur during usage. With this navigator you can also control brightness and navigating the OSD menu for further preferences. Two different versions are available of this navigator:

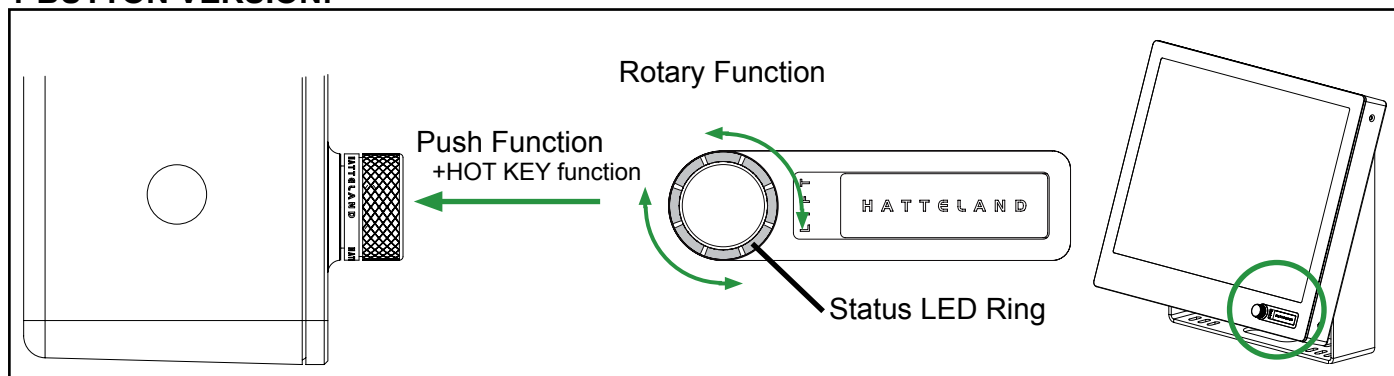
Bracket Version (i.e. cockpit use) = **1-button** (with rotary switch and USB Connector)
 Console Version (i.e. flybridge use) = **3-button** (without rotary switch and USB Connector)

The navigator is mounted into the glass by factory default and can not be replaced afterwards. The console version of the user controls in front is IP66 rated. Please refer to the illustrations below to determine what version you have and how to operate the unit. The USB connector is located behind the HATTELAND® rubber hatch in the right lower corner in the front. The rubber hatch **IS NOT** designed to be removed, but lifted/bended away as the arrow below shows. Use a pen, nail or similar to open the hatch. The rubber hatch can later be pushed back into place when the USB front connector is not in use.

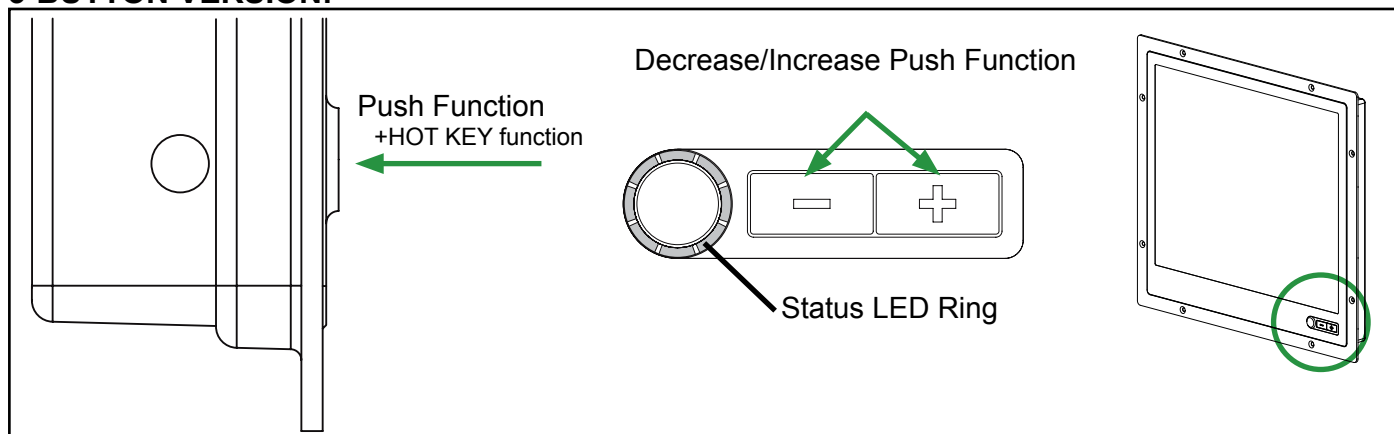
1-BUTTON VERSION WITH FRONT USB BEHIND RUBBER HATCH:



1-BUTTON VERSION:



3-BUTTON VERSION:



Power ON:

To turn the unit on, push the navigator knob/button inwards. The unit will start searching for signal sources. A green led will move around the led ring. Please read the STATUS LED overview on the next page for verification on the various LED patterns.

Power OFF:

To turn the unit off, push the navigator knob/button inwards and hold it down for 6 seconds, after 3 seconds the menu will appear. 3 seconds later the unit is turned off, and all LED indicators will turn red. Also read the STATUS LED overview on the next page for various LED patterns.

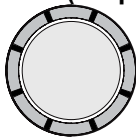
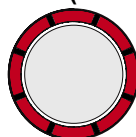
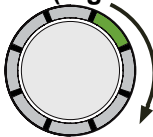




Status LED Overview

HOT KEY FUNCTION:

User can access input video/signal sources by DOUBLE clicking the navigator knob/button inwards. The cycle of the video/signal detection are; Analog RGB1, Analog RGB2, DVI, Composite Video & S-Video. It will only switch to the next detectable video/signals sources that are present (physically connected). The incoming signal will be identified and displayed as clear text in the upper left corner of the display.

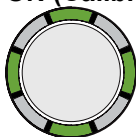

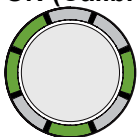
STATUS LED OVERVIEW

The display features a multi purpose indicator LED status ring which through different patterns and realtime activity gives back the status of the signal detected, power on/off, calibration, menu activity and more. The LEDs are multicolored which either illuminate green or red, based on the activity.

OFF (No power connected)  8 LED OFF	OFF (Standby, power detected)  8 RED LED STATIC ON	ON (Signal Search)  1 GREEN LED MOVEMENT looping.
ON (Signal OK)  8 GREEN LED STATIC ON	ON (No Signal)  4 RED LED STATIC ON	ON (Menu Delay)  7 GREEN LED STATIC + 1 LED OFF MOVEMENT doing 1 loop.
OFF (Shutdown)  1 RED LED MOVEMENT doing 1 loop.		

For ECDIS Calibrated Products

For the MMD/MMC products that are ECDIS calibrated from factory, the following LED pattern (Calibrated) indicates that the backlight/brightness is at calibrated level. **(Calibrated +)** or **(Calibrated -)** means that the knob/brightness is above or below the calibrated brightness level. Fine adjust the navigator knob either clockwise or counter-clockwise until the pattern for **(Calibrated)** is reached.

ON (Calibrated)  4 GREEN LED STATIC ON	ON (Calibrated +)  4 GREEN LED STATIC ON + where 1 show BRIGHTNESS INDICATION POSITION	ON (Calibrated -)  4 GREEN LED STATIC ON + where 1 show BRIGHTNESS INDICATION POSITION
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On Screen Display (OSD) Menu Navigating

QUICK START:

The On Screen Display (OSD menu) is accessible by pushing the navigator knob/button inwards AND hold it for 3 seconds. To understand the menu and its usage, please follow these steps for a quick start.

1-BUTTON VERSION: (with rotary switch and USB Connector)

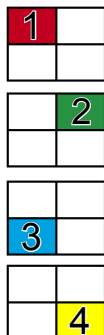
- 1: While powered on, and image visible on screen, push the navigator knob inwards and hold for 3 seconds. The OSD menu will be visible with available functions you can adjust or control.
- 2: You can move to the next function icon by using the navigator rotary function (clockwise or counter-clockwise). Select function by pressing the navigator knob inwards. You will now enter it's menu and options.
- 3: Select clear text options within icon menu by using the navigator rotary function again. It will be possible to navigate upwards and downwards by rotating the navigator knob. The selected option will turn yellow. Push the navigator knob inwards once and the option will be editable.
- 4: Use the navigator rotary function to increase/decrease/select values or enter sub-menus.
- 5: To confirm the changes, select the option "RETURN". After this, navigate to the EXIT icon and push the navigator knob to save settings and remove the menu overlay. "RETURN" will always exit to the previous menu.

3-BUTTON VERSION: (without rotary switch and USB Connector)

- 1: While powered on, and image visible on screen, push the navigator button inwards and hold for 3 seconds. The OSD menu will be visible with available functions you can adjust or control.
- 2: You can move to the next icon by pushing the decrease/increase (-/+) buttons. Select function by pressing the navigator button inwards. You will now enter it's menu and options.
- 3: Select clear text options within icon menu by pushing the navigator button. It will be possible to navigate upwards and downwards by pushing the decrease/increase (-/+) buttons. The selected option will turn yellow. Push the navigator button inwards once and the option will be editable.
- 4: Use "-" or "+" buttons to increase/decrease values or enter sub-menus.
- 5: To confirm the changes, select the option "RETURN". After this, navigate to the EXIT icon and push the navigator knob to save settings and remove the menu overlay. "RETURN" will always exit to the previous menu.

OSD MENUS:

The OSD menu consists of 4 modes: (This icon will indicate if function is available throughout the manual).



Mode 1 - Available functions in **RGB / DVI MODE "Simplified" OSD Menu - (Logo will appear)**

User can adjust the most common functions needed to operate the display.

**Some functions are not available in DVI mode*

Mode 2 - Available functions in **RGB / DVI* MODE "Full" OSD Menu - (No logo will appear)**

User can access more advanced functions. (Service menu)

**Some functions are not available in DVI mode*

Mode 3 - Available functions in **VIDEO MODE "Simplified" OSD Menu - (Logo will appear)**

User can adjust the most common functions needed to operate the display.

Mode 4 - Available functions in **VIDEO MODE "Full" OSD Menu - (No logo will appear)**

User can access more advanced functions. (Service menu)


RGB/DVI MODE = When RGB/DVI signal (i.e OS or radar / charts) are displayed full screen.

VIDEO MODE = When video signal (i.e CAMERA / VCR / DVD) are displayed full screen.

OSD KEYCODE/MODES:

If the OSD menu has been set to "Simplified" mode, a special keycode has to be entered before the OSD menu will be accessible as "Full" mode again. After changes has been made in the "Full" mode, and user exits the menu, the OSD menu will reset back to "Simplified" upon next entry of the OSD Menu. This can be overridden while in "Full" mode, by setting the "Utilities/OSD Settings/Default OSD Mode/" to always be in "Full" mode. When user enters the menu anytime, the "Full" mode menu will be available always. By Factory Default the OSD menu layout is set to "Full" mode.

The keycode procedure is to prevent unqualified personnel entering the OSD menu and make severe changes that may affect the overall performance of the unit after installment. The special keycode is by factory default set to **158**.

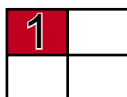
The keycode field will be located in the lower right corner of the screen, and looks like this: 
(Use the navigator buttons/knob to change/enter the code).



WARNING !! MODIFYING CERTAIN PARAMETERS MAY AFFECT THE PERFORMANCE OF THE DISPLAY.

On Screen Display (OSD) Menu Overview

Mode 1 - Function layout in RGB / DVI MODE “Simplified” OSD Menu:



Note that to be in RGB / DVI MODE, a computer signal must be present in full screen, i.e Windows or other operating system/radar system. Having a Picture-In-Picture (PIP) view simultaneously will not interfere or change the menu structure in any way.



Mode 2 - Function layout in RGB / DVI MODE “Full” OSD Menu:



Note that to be in RGB / DVI MODE, a computer signal must be present in full screen, i.e Windows or other operating system/radar system. Having a Picture-In-Picture (PIP) view simultaneously will not interfere or change the menu structure in any way.



On Screen Display (OSD) Menu Overview

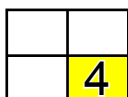
Mode 3 - Function layout in VIDEO MODE “Simplified” OSD Menu:



Note: To access this menu, a video signal must be present in full screen, i.e from a camera, VCR or DVD player.



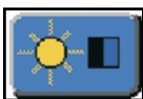
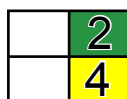
Mode 4 - Function layout in VIDEO MODE “Full” OSD Menu:



Note: To access this menu, a video signal must be present in full screen, i.e from a camera, VCR or DVD player.



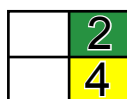
On Screen Display (OSD) Menu Functions



BRIGHTNESS AND CONTRAST: (No function for DVI signals)

Selecting this function will enable the user to adjust brightness and contrast for the display.

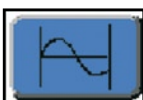
(No Function in DVI) BRIGHTNESS:  Increase/decrease brightness level, total: 100 steps
 (No Function in DVI) CONTRAST:  Increase/decrease contrast level, total: 100 steps



COLOR TEMPERATURE:




Selecting this function will enable the user to modify the warmth of the picture. Higher temperature = "cooler" picture. Lower temperature = "warmer" picture.

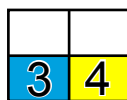
User can select between presets 9500K, 8000K, 6500K, and 5000K color temperature measured in Kelvin. User can also manually adjust the color temperature in R,G and B values by clicking on "Color Temperature Adjust" and enter its sub-menu.



FREQUENCY AND PHASE: (Some functions not available in DVI mode)




Selecting this function will enable the user to modify the image horizontal size and fine tune the image quality.

(No Function in DVI) FREQUENCY:  Increase/decrease the image horizontal size.
 (No Function in DVI) PHASE:  Fine tune the data sampling position (adjust image quality.)
 (No Function in DVI) SHARPNESS:  Increase/decrease video image sharpness level.
 PICTURE TYPE: Motion / Still (Adjustment for best image quality)
 If graphics on screen move a lot, select "Motion"
 If graphics on screen are mostly still, select "Still"
 AUTO SETUP: Use this to automatically adjust/fine tune/sync the incoming signal to automatic default and optimal values gathered from the graphics controller and the incoming signal.



VIDEO ADJUSTMENT:

Selecting this function will enable the user to modify the color saturation of the video signal along with tint and sharpness.

COLOR:  Increase/decrease video color level.
 TINT:  Increase/decrease tint level.
 SHARPNESS:  Increase/decrease video image sharpness level.

PICTURE TYPE: Motion / Still / Normal (Adjustment for best image quality)
 If graphics on screen move a lot, select "Motion"
 If graphics on screen are mostly still, select "Still"
 General motion - non flicker mode, select "Normal"
 VIDEO TYPE: Change to best match the source signal. (DVD / VCR)

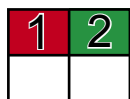


VIDEO SYSTEM:

Selecting this function will enable the user to select video system and input signals.

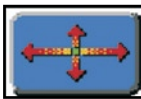
AUTO : Automatic detection of NTSC or PAL system. (Not applicable in SECAM)
 NTSC / NTSC 4.43 : Manual select NTSC system.
 PAL / PAL M : Manual select PAL system.
 SECAM : Manual select SECAM system.

On Screen Display (OSD) Menu Functions



STATUS:

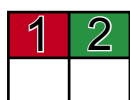
Selecting this function will display graphic information such as the detected incoming resolution and frequency.



POSITION: (No function in DVI mode)

Selecting this function will enable the user to position the image within the display area.

(No Function in DVI) HORZ POSITION : Position the image vertically.
 (No Function in DVI) VERT POSITION : Position the image horizontally.





PICTURE IN PICTURE:

Selecting this function will enable the user to configure PIP window size, input signal source, horizontal and vertical position and more.






PIP SIZE : Select PIP window size. Adjustable in steps 0 (off) to 24.
 PIP SOURCE : Select video source to be displayed in PIP window.

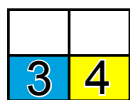
Available sources are:

AUTO = automatic detection of Composite, S-Video.
 COMP = manual select composite video signal only.
 SVID = manual select S-Video signal only.

HORZ POSITION:  Adjust the position of the PIP window horizontally.
 VERT POSITION:  Adjust the position of the PIP window vertically.

ADVANCED SETTINGS: (Click to enter sub-menu) - **NOTE: Tint adjust not available for S-Video signals.**

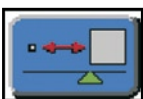
BRIGHTNESS:  Increase/decrease the image brightness of the PIP window.
 CONTRAST:  Increase/decrease the image contrast of the PIP window.
 SHARPNESS:  Increase/decrease the image sharpness of the PIP window.
 TINT:  Increase/decrease the tint of the image of the PIP window.
 COLOR:  Increase/decrease the color of the image of the PIP window.



ROTATION:

Selecting this function will enable the user to rotate the image to either landscape (NORMAL) or portrait (ROTATED) format.

On Screen Display (OSD) Menu Functions



GRAPHIC SCALING MODES:

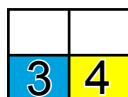
Selecting this function will enable the user to configure the graphic scaling of the RGB/DVI or VIDEO image. The change will happen realtime.

Note: Some of these functions will impact on image quality, and will therefore not show the optimal 1:1 picture with correct aspect ratio and resolution suitable for the TFT module.



Scaling methods in PC/DVI MODE:

ONE TO ONE, FILL SCREEN,
FILL TO ASPECT RATIO,
NONLINEAR SCALING MODES



Scaling methods in VIDEO MODE:

NORMAL, LETTERBOX,
LETTERBOX WITH SUBTITLES,
NONLINEAR SCALING MODES



FILL SCREEN
FILL TO ASPECT RATIO

: Enable full screen expansion for lower resolution image.
: Enable full screen expansion for lower resolution image according to aspect ratio.



LETTERBOX
LETTERBOX WITH SUBTITLES

: Stretches a letterboxed picture to full screen.
: Stretches and pans a letterboxed picture to full screen, which enables viewing of subtitles in bottom.



NONLINEAR SCALING PARAMETERS: (Click to enter sub-menu)

Will either clip the image off (to black), or stretch/scale the image. This will impact on image quality, and will therefore not show the optimal 1:1 picture with correct aspect ratio and resolution suitable for the TFT module.

HORIZONTAL CLIPPING:
HORIZONTAL OFFSET:
HORIZONTAL STRETCH:
VERTICAL CLIPPING:
VERTICAL OFFSET:
VERTICAL STRETCH:



Increase/decrease the horizontal clipping.
Increase/decrease the horizontal offset.
Increase/decrease the horizontal stretch.
Increase/decrease the vertical clipping.
Increase/decrease the vertical offset.
Increase/decrease the vertical stretch.



LANGUAGE:

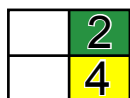
Available languages are: English, Norwegian, Chinese (Simplified) and French. This will affect all text and messages in the OSD menus instantly upon selecting them.

On Screen Display (OSD) Menu Functions



UTILITIES:

Selecting this function will enable the user to configure the OSD menu behaviour, image properties, verify BIOS Firmware version and miscellaneous operations.



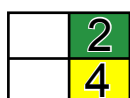
USER SETTING: (Click to enter sub-menu)

DPMS	: Disable / Enable the DPMS (power saving when no signal)
DISPLAY INPUT	: Disable / Enable displaying signal source name as OSD text.
AUTO SOURCE SELECT	: Off = Disable auto source select function. Low = Auto source select enabled ONLY in power up. High = Auto source select ALWAYS enabled. (Default Setting)
GAMMA	: 1.0 / 1.6 / 2.2 - Adjusts gamma on TFT display.
DVI CABLE LENGTH	: Normal / Long (By selecting "Long", a electronic eq circuit will enhance the signal to achive longer carrier over 2m and still keep the quality/strength).
COMMUNICATION SETTINGS	: Serial Mode = [RS232] - [4 Wire RS485/422] - [2 Wire RS485] Serial Adress = Select and unique adress from 0 to 15 (Consult the "Serial Control Interface - MMD / MMC" manual.)



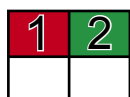
OSD SETTINGS: (Click to enter sub-menu)

OSD H-POSITION:		Position the OSD menu horizontally.
OSD V-POSITION:		Position the OSD menu vertically.
OSD BACKGROUND		: Choose between Translucent or Opaque.
OSD ROTATE		: Choose between Normal / Rotate. Will position the menu either horizontally or vertically.
USER TIME OUT		: Adjust the OSD menu time out period in a step of 5 seconds.
DEFAULT OSD MODE		: Simplified or Full menus. (option only available in "full mode")
FULL MENU		: Upon selecting this function, the menu software will request a keycode to unlock the FULL menu (while in simplified mode) (Please refer to the beginning of this chapter for information)



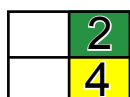
ZOOM: (Click to enter sub-menu)

ZOOM LEVEL:		Zooms in the display area from center.
HORIZONTAL PAN:		Pan the display area horizontally.
VERTICAL PAN:		Pan the display area vertically.



CALIBRATE RGB GAIN

: Perform automatic color calibration.



DISPLAY ORIENTATION: (Click to enter sub-menu)

Will flip/inverse the display area including PIP view.

Choices are: Normal / Horizontal Inverse / Vertical Inverse / Inverse

On Screen Display (OSD) Menu Functions



LOAD DEFAULT: (Click to enter sub-menu)

LOAD USER DEFAULT
SAVE USER DEFAULT
LOAD FACTORY DEFAULT

: Load your own custom settings.
: Save your own custom settings.
: Will reset the VGA controller settings to the factory preset. Use caution when using this function, as this will override your current settings.

SETUP DDC

: Display Data Channel. Reset/optimize image information.

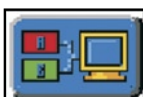


This function should be executed to setup correct DDC (Display Data Channel) information when the backpack has been replaced. It allows the display to send its specifications to the display controller.



TEST PATTERN

: Shows a generic test pattern.



VIDEO SOURCE:

Selecting this function will enable the user to select the type of input signal to show fullscreen. Available inputs are: Analog RGB1, Analog RGB2, DVI, Composite Video, and S-Video. The display unit will switch signal source instantly, so if no signal source is present (physically connected) the image will be black for 1-2 seconds before it resets back to the previous detected signal.



POWER OFF:

Selecting this function will start the shutdown procedure for the unit. Please read the STATUS LED overview section for more information.



EXIT:

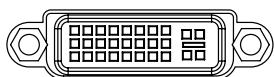
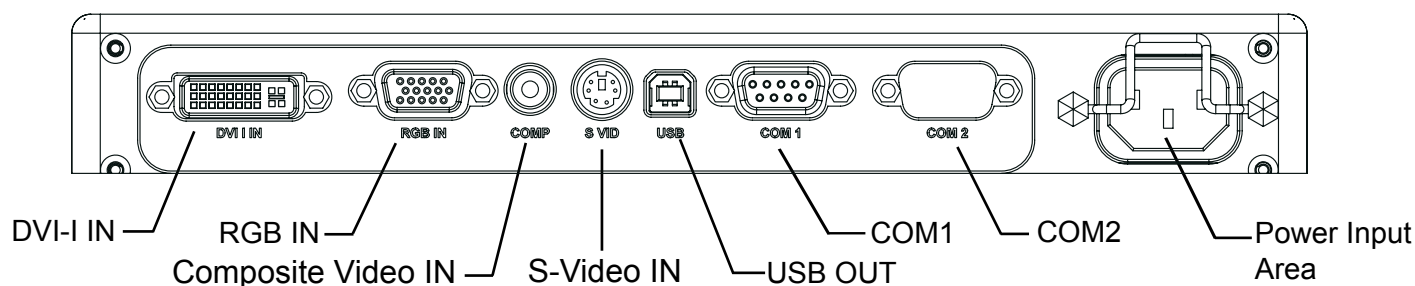
Selecting this function will exit the OSD menu and save the current settings.

Note:

The OSD settings will also automatically be stored in memory when the OSD exit on user timeout.

Physical Connections - MMD Backpack Series 2

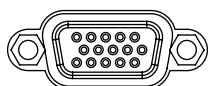
Connection area of backpack (illustration)



DVI-I IN / RGB2 IN: (Supports both DVI & Analog RGB)

Connect the DVI cable to the DVI-I 24+5P Connector (female) on the rear side of the TFT display. Screw the DVI cable to the connector spacers and make sure you don't bend any of the pins inside the DVI cable connector. Connect the other end to your computer equipment.

This DVI-I connector can also be converted to function as RGB IN by using the provided DVI<>RGB adapter plug.



RGB1 IN:

Connect the VGA cable to this D-SUB 15P Connector (female) on the rear side of the TFT display. Screw the VGA cable to the D-SUB connector spacers and make sure you don't bend any of the pins inside the VGA cable connector. Connect the other end to your computer equipment.



COMPOSITE IN (PAL/NTSC/SECAM VIDEO):

Connect your composite video signal cable into this RCA jack plug. To activate the Picture In Picture function, the TFT display must be configured via the OSD menus.

- Note that *Composite Video* must be selected as the incoming video source in the OSD menu.



S-VIDEO IN:

Connect your S-Video (SVHS) video signal cable into this mini 4-way din plug. It can only be inserted one way and make sure you don't bend any of the pins inside your cable. To activate the Picture In Picture function, the TFT display must be configured via the OSD menus.

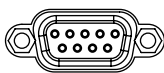
- Note that *S-Video* must be selected as the incoming video source in the OSD menu.



USB OUT:

This USB TYPE B connector is used as a loopthrough from the front connector on a Series 2 TFT compatible display. It allows you to connect peripherals in the front of your display unit and connect them further to your computer equipment. The signal is transferred without any conversion and is a direct 1-1 cable connection.

Physical Connections - MMD Backpack Series 2



COM1 SERIAL CONTROL INTERFACE:

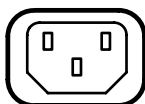
This serial remote control connector D-SUB 9PIN Female (RS232) allows to control various parameters on the TFT display such as brightness via customized software. For in-depth information, see www.hatteland-display.com:

“Support/Accessories/HATTELAND® SCOM/Technical Manual” as PDF file.



COM2 - TOUCH/FEATURE CONNECTOR:

On Touch Screen versions of the backpack a USB Type B Connector is factory mounted here which should be connected to a computer with touch screen drivers installed. See the touch screen chapter in this manual for more information. This space/connector area is also reserved for future applications or custom models.



POWER INPUT: (AC Version)

The internal AC power module supports both 115VAC & 230VAC - 50/60Hz power input. You may secure the connector further by using the clamp mounted on the connector base.



POWER INPUT: (DC Version)

Secure the cables (check polarity on your model, marked on the label) to the screw terminal. The internal DC power module supports 24 VDC nominal (18-36VDC).

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Specifications

Specifications - HD 12T04 BOxx + HD MMD01-xxx

TECHNICAL DESCRIPTION

TFT Characteristics:

- TFT Technology : Color Active Matrix LCD Module
a-Si Thin Film Transistor (TFT)
- TFT Size : 12.1 inch
- Pixel Number : 1024 x 768
- Pixel Pitch (RGB) : 0.24 (H) x 0.24 (V) mm
- Response Time : 33 ms (TYP) - black to white to black
- Contrast Ratio : 600:1 (TYP)
- Light Intensity : 400 cd/m² (TYP)
- Viewable Angle : 45°(Up), 55°(Down), 70°(Left/Right) (TYP)
- Active Display Area : 245.76 (H) x 184.32 (V) mm
- Max Colors : 16.7 millions

Synchronisation & Signals:

Analog RGB1 & RGB2:

- Separate, composite synchronisation & synchronisation on green.
- Interlaced and non interlaced
- Auto detects VGA -> UXGA
- VGA : 640 x 480 (including 640 x 350)
- SVGA : 800 x 600 (including 720 x 400)
- XGA : 1024 x 768 (Recommended @ 60Hz)
- SXGA : 1280 x 1024
- UXGA : 1600 x 1200
- Sync. Range Horizontal : See "Preset Signal Timings" in user manual.
- Sync. Range Vertical : See "Preset Signal Timings" in user manual.

DVI:

- Auto detects VGA -> XGA

Composite & S-Video:

- Interlaced PAL / NTSC / SECAM

Power Specifications:

Power Supply Options & Type Numbers:

- 115&230VAC - 50/60Hz : HD 12T04 BOxx + HD MMD01-xx1
- 24 VDC : HD 12T04 BOxx + HD MMD01-xx2

Power Consumption:

- Operating : 23W (Max) (Brightness @ 100%)

Note: All specifications are subject to change without prior notice!

MECHANICAL DESCRIPTION

Physical Considerations:

- 296 (W) x 252 (H) x 75 (D) mm (without bracket)
- 296 (W) x 370 (H) x 146 (D) mm (with bracket)
- Weight: 5kg (approx)

User I/O Ports:

Behind Rubber Hatch - Front (BOAA / BOAC only):

- USB IN : 1 x USB TYPE A (for loopthrough)

Backpack:

- DVI-I Signal IN : 1 x 24Pin DVI-I (or as RGB IN with adapter)
- RGB Signal IN : 1 x 15Pin HD D-SUB (female)
- Comp. Video IN : 1 x RCA Phono (female)
- S-Video IN : 1 x SVHS S-Video (female)
- USB OUT : 1 x USB TYPE B (for loopthrough)
- COM1 RS232 : 1 x D-SUB 9P (female) (Serial Contr. Interface)
- If AC Power IN : 1 x Std IEC Inlet (female)
- If DC Power IN : 1 x Screw Terminals

Optional Solutions:

- COM2 : 1 x D-SUB 9P (female) (Feature Connector)

User Controls - BOAA / BOAC:

- Navigator Push Function : On/Off, OSD Menu, Hotkey
- Navigator Rotary Function : Brightness, Menu Navigator
- Navigator Indicator : Mode Status LEDs

User Controls - BOBA / BOBC:

- Navigator Push Function : On/Off, OSD Menu, Hotkey
- Navigator +/- Buttons Function : Brightness, Menu Navigator
- Navigator Indicator : Mode Status LEDs

Environmental Considerations:

- Operating : Temperature -15 deg. C to +55 deg. C
- Humidity 20% to 85% (non condensing)
- Storage : Temperature -20 deg. C to +60 deg. C
- Humidity 5% to 85% (non condensing)
- IP Rating : IP22 (BOAA/BOAC) or IP66 (BOBA/BOBC) models
- Compass Safe Dist. : HD 12T04 BOxx + HD MMD01-xxx
Standard: 70cm Steering: 50cm

To prevent heat to build up inside the display we recommend installing the unit in a vertical position +/- 40 degrees maximum. We also recommend adding forced cooling in applications where; Vertical mounting angle is above +/- 40 degrees -- Operating temperature is above 25C -- Ventilation area around unit is restricted. Fans should be mounted to enhance natural airflow directed upwards through the unit.

Safety Considerations:

Even although the test conditions for bridge units provide for a maximum operating temperature of 55°C, continuous operation of all electronic components should, if possible, take place at ambient temperatures of only 25°C. This is a necessary prerequisite for long life and low service costs.

Accessories / Options:

- VSD100507-1 Split Cable RS422/485 - MALE to 2 x FEMALE 9P D-SUB
- Resistive Factory Mounted Touchscreen (BOAC/BOBC+Cxx Backpack)4wire
- HD VESA 12TBR-A1 - VESA bracket for complete unit.
- HD 12TBR CMB-A1 - Console Mounting Bracket for complete unit

NOTE: Products with factory mounted touchscreen is not type approved

TESTING/APPROVALS & CERTIFICATES

This product have been tested / type approved by the following classification societies:

EN60945 4th (IEC945 4th)
IACS E10

DNV - Det Norske Veritas
BV - Bureau Veritas

ABS - American Bureau of Shipping
GL - Germanischer Lloyd

ClassNK - Nippon Kaiji Kyokai

Specifications - HD 12T04 FOxx + HD MMD01-xxx

TECHNICAL DESCRIPTION

TFT Characteristics:

- TFT Technology : Color Active Matrix LCD Module a-Si Thin Film Transistor (TFT)
- TFT Size : 12.1 inch
- Pixel Number : 1024 x 768
- Pixel Pitch (RGB) : 0.24 (H) x 0.24 (V) mm
- Response Time : 33 ms (TYP) - black to white to black
- Contrast Ratio : 600:1 (TYP)
- Light Intensity : 400 cd/m² (TYP)
- Viewable Angle : 45°(Up), 55°(Down), 70°(Left/Right) (TYP)
- Active Display Area : 245.76 (H) x 184.32 (V) mm
- Max Colors : 16.7 millions

Synchronisation & Signals:

Analog RGB1 & RGB2:

- Separate, composite synchronisation & synchronisation on green.
- Interlaced and non interlaced
- Auto detects VGA -> UXGA
- VGA : 640 x 480 (including 640 x 350)
- SVGA : 800 x 600 (including 720 x 400)
- XGA : 1024 x 768 (Recommended @ 60Hz)
- SXGA : 1280 x 1024
- UXGA : 1600 x 1200
- Sync. Range Horizontal : See "Preset Signal Timings" in user manual.
- Sync. Range Vertical : See "Preset Signal Timings" in user manual.

DVI:

- Auto detects VGA -> XGA

Composite & S-Video:

- Interlaced PAL / NTSC / SECAM

Power Specifications:

Power Supply Options & Type Numbers:

- 115&230VAC - 50/60Hz : HD 12T04 FOxx + HD MMD01-xx1
- 24 VDC : HD 12T04 FOxx + HD MMD01-xx2

Power Consumption:

- Operating : 23W (Max) (Brightness @ 100%)

Note: All specifications are subject to change without prior notice!

MECHANICAL DESCRIPTION

Physical Considerations:

- 311 (W) x 267 (H) x 75 (D) mm (with flange)
- Weight: 4.5kg (approx)

User I/O Ports:

Behind Rubber Hatch - Front (FOAA / FOAC only):

- USB IN : 1 x USB TYPE A (for loopthrough)

Backpack:

- DVI-I Signal IN : 1 x 24Pin DVI-I (or as RGB IN with adapter)
- RGB Signal IN : 1 x 15Pin HD D-SUB (female)
- Comp. Video IN : 1 x RCA Phono (female)
- S-Video IN : 1 x SVHS S-Video (female)
- USB OUT : 1 x USB TYPE B (for loopthrough)
- COM1 RS232 : 1 x D-SUB 9P (female) (Serial Contr. Interface)
- If AC Power IN : 1 x Std IEC Inlet (female)
- If DC Power IN : 1 x Screw Terminals

Optional Solutions:

- COM2 : 1 x D-SUB 9P (female) (Feature Connector)

User Controls - FOBA / FOBC:

- Navigator Push Function : On/Off, OSD Menu, Hotkey
- Navigator +/- Buttons Function : Brightness, Menu Navigator
- Navigator Indicator : Mode Status LEDs

User Controls - FOAA / FOAC:

- Navigator Push Function : On/Off, OSD Menu, Hotkey
- Navigator Rotary Function : Brightness, Menu Navigator
- Navigator Indicator : Mode Status LEDs

Environmental Considerations:

- Operating : Temperature -15 deg. C to +55 deg. C
- Humidity 20% to 85% (non condensing)
- Storage : Temperature -20 deg. C to +60 deg. C
- Humidity 5% to 85% (non condensing)
- IP Rating : IP22 (FOAA/FOAC) or IP66 (FOBA/FOBC) models
- Compass Safe Dist. : HD 12T04 FOxx + HD MMD01-xxx
Standard: 70cm Steering: 50cm

To prevent heat to build up inside the display we recommend installing the unit in a vertical position +/- 40 degrees maximum. We also recommend adding forced cooling in applications where; Vertical mounting angle is above +/- 40 degrees -- Operating temperature is above 25C -- Ventilation area around unit is restricted. Fans should be mounted to enhance natural airflow directed upwards through the unit.

Safety Considerations:

Even although the test conditions for bridge units provide for a maximum operating temperature of 55°C, continuous operation of all electronic components should, if possible, take place at ambient temperatures of only 25°C. This is a necessary prerequisite for long life and low service costs.

Available Options/Accessories:

- Resistive Factory Mounted Touchscreen (FOAC/FOBC+Cxx Backpack)4wire
- VSD100507-1 Split Cable RS422/485 : MALE to 2 x FEMALE 9P D-SUB

NOTE: Products with factory mounted touchscreen is not type approved

TESTING / APPROVALS & CERTIFICATES

This product have been tested / type approved by the following classification societies:

Specifications - HD 12T04 COxx + HD MMD01-xxx

TECHNICAL DESCRIPTION

TFT Characteristics:

- TFT Technology : Color Active Matrix LCD Module a-Si Thin Film Transistor (TFT)
- TFT Size : 12.1 inch
- Pixel Number : 1024 x 768
- Pixel Pitch (RGB) : 0.24 (H) x 0.24 (V) mm
- Response Time : 33 ms (TYP) - black to white to black
- Contrast Ratio : 600:1 (TYP)
- Light Intensity : 400 cd/m² (TYP)
- Viewable Angle : 45°(Up), 55°(Down), 70°(Left/Right) (TYP)
- Active Display Area : 245.76 (H) x 184.32 (V) mm
- Max Colors : 16.7 millions

Synchronisation & Signals:

Analog RGB1 & RGB2:

- Separate, composite synchronisation & synchronisation on green.
- Interlaced and non interlaced
- Auto detects VGA -> UXGA
- VGA : 640 x 480 (including 640 x 350)
- SVGA : 800 x 600 (including 720 x 400)
- XGA : 1024 x 768 (Recommended @ 60Hz)
- SXGA : 1280 x 1024
- UXGA : 1600 x 1200
- Sync. Range Horizontal : See "Preset Signal Timings" in user manual.
- Sync. Range Vertical : See "Preset Signal Timings" in user manual.

DVI:

- Auto detects VGA -> XGA

Composite & S-Video:

- Interlaced PAL / NTSC / SECAM

Power Specifications:

Power Supply Options & Type Numbers:

- 115&230VAC - 50/60Hz : HD 12T04 COxx + HD MMD01-xx1
- 24 VDC : HD 12T04 COxx + HD MMD01-xx2

Power Consumption:

- Operating : 23W (Max) (Brightness @ 100%)

Note: All specifications are subject to change without prior notice!

MECHANICAL DESCRIPTION

Physical Considerations:

- 293 (W) x 337 (H) x 75 (D) mm (with flange)
- Weight: 4.5kg (approx)

User I/O Ports:

Behind Rubber Hatch - Front (COAA / COAC only):

- USB IN : 1 x USB TYPE A (for loopthrough)

Backpack:

- DVI-I Signal IN : 1 x 24Pin DVI-I (or as RGB IN with adapter)
- RGB Signal IN : 1 x 15Pin HD D-SUB (female)
- Comp. Video IN : 1 x RCA Phono (female)
- S-Video IN : 1 x SVHS S-Video (female)
- USB OUT : 1 x USB TYPE B (for loopthrough)
- COM1 RS232 : 1 x D-SUB 9P (female) (Serial Contr. Interface)
- If AC Power IN : 1 x Std IEC Inlet (female)
- If DC Power IN : 1 x Screw Terminals

Optional Solutions:

- COM2 : 1 x D-SUB 9P (female) (Feature Connector)

User Controls - COBA / COBC:

- Navigator Push Function : On/Off, OSD Menu, Hotkey
- Navigator +/- Buttons Function : Brightness, Menu Navigator
- Navigator Indicator : Mode Status LEDs

User Controls - COAA / COAC:

- Navigator Push Function : On/Off, OSD Menu, Hotkey
- Navigator Rotary Function : Brightness, Menu Navigator
- Navigator Indicator : Mode Status LEDs

Environmental Considerations:

- Operating : Temperature -15 deg. C to +55 deg. C
- Humidity 20% to 85% (non condensing)
- Storage : Temperature -20 deg. C to +60 deg. C
- Humidity 5% to 85% (non condensing)
- IP Rating : IP22 (COAA/COAC) or IP66 (COBA/COBC) models
- Compass Safe Dist. : HD 12T04 COxx + HD MMD01-xxx
Standard: 70cm Steering: 50cm

To prevent heat to build up inside the display we recommend installing the unit in a vertical position +/- 40 degrees maximum. We also recommend adding forced cooling in applications where; Vertical mounting angle is above +/- 40 degrees -- Operating temperature is above 25C -- Ventilation area around unit is restricted. Fans should be mounted to enhance natural airflow directed upwards through the unit.

Safety Considerations:

Even although the test conditions for bridge units provide for a maximum operating temperature of 55°C, continuous operation of all electronic components should, if possible, take place at ambient temperatures of only 25°C. This is a necessary prerequisite for long life and low service costs.

Available Options/Accessories:

- Resistive Factory Mounted Touchscreen (COAC/COBC+Cxx Backpack)4wire
- VSD100507-1 Split Cable RS422/485 : MALE to 2 x FEMALE 9P D-SUB

NOTE: Products with factory mounted touchscreen is not type approved

TESTING / APPROVALS & CERTIFICATES

This product have been tested / type approved by the following classification societies:

EN60945 4th (IEC945 4th)
IACS E10

DNV - Det Norske Veritas
BV - Bureau Veritas

ABS - American Bureau of Shipping
GL - Germanischer Lloyd

ClassNK - Nippon Kaiji Kyokai

Specifications - HD 15T06 BOxx + HD MMD01-xxx

TECHNICAL DESCRIPTION

TFT Characteristics:

- TFT Technology : Color Active Matrix LCD Module
a-Si Thin Film Transistor (TFT)
- TFT Size : 15.0 inch
- Pixel Number : 1024 x 768
- Pixel Pitch (RGB) : 0.297 (H) x 0.297 (V) mm
- Response Time : 30 ms (TYP) - black to white to black
- Contrast Ratio : 350:1 (TYP)
- Light Intensity : 600 cd/m² (TYP)
- Viewable Angle : 45°(Up), 55°(Down), 60°(Left/Right) (TYP)
- Active Display Area : 304.1 (H) x 228.1 (V) mm
- Max Colors : 16.7 millions

Synchronisation & Signals:

Analog RGB1 & RGB2:

- Separate, composite synchronisation & synchronisation on green.
- Interlaced and non interlaced
- Auto detects VGA -> UXGA
- VGA : 640 x 480 (including 640 x 350)
- SVGA : 800 x 600 (including 720 x 400)
- XGA : 1024 x 768 (Recommended @ 60Hz)
- SXGA : 1280 x 1024
- UXGA : 1600 x 1200
- Sync. Range Horizontal : See "Preset Signal Timings" in user manual.
- Sync. Range Vertical : See "Preset Signal Timings" in user manual.

DVI:

- Auto detects VGA -> XGA

Composite & S-Video:

- Interlaced PAL / NTSC / SECAM

Power Specifications:

Power Supply Options & Type Numbers:

- 115&230VAC - 50/60Hz : HD 15T06 BOxx + HD MMD01-xx1
- 24 VDC : HD 15T06 BOxx + HD MMD01-xx2

Power Consumption:

- Operating : 35W (Max) (Brightness @ 100%)

Note: All specifications are subject to change without prior notice!

MECHANICAL DESCRIPTION

Physical Considerations:

- 344 (W) x 292 (H) x 75 (D) mm (without bracket)
- 344 (W) x 326 (H) x 153 (D) mm (with bracket)
- Weight: 8kg (approx)

User I/O Ports:

Behind Rubber Hatch - Front (BOAA / BOAC only):

- USB IN : 1 x USB TYPE A (for loophthrough)

Backpack:

- DVI-I Signal IN : 1 x 24Pin DVI-I (or as RGB IN with adapter)
- RGB Signal IN : 1 x 15Pin HD D-SUB (female)
- Comp. Video IN : 1 x RCA Phono (female)
- S-Video IN : 1 x SVHS S-Video (female)
- USB OUT : 1 x USB TYPE B (for loophthrough)
- COM1 RS232 : 1 x D-SUB 9P (female) (Serial Contr. Interface)
- If AC Power IN : 1 x Std IEC Inlet (female)
- If DC Power IN : 1 x Screw Terminals

Optional Solutions:

- COM2 : 1 x D-SUB 9P (female) (Feature Connector)

User Controls - BOAA / BOAC:

- Navigator Push Function : On/Off, OSD Menu, Hotkey
- Navigator Rotary Function : Brightness, Menu Navigator
- Navigator Indicator : Mode Status LEDs

User Controls - BOBA / BOBC:

- Navigator Push Function : On/Off, OSD Menu, Hotkey
- Navigator +/- Buttons Function : Brightness, Menu Navigator
- Navigator Indicator : Mode Status LEDs

Environmental Considerations:

- Operating : Temperature -15 deg. C to +55 deg. C
- Humidity 20% to 85% (non condensing)
- Storage : Temperature -20 deg. C to +60 deg. C
- Humidity 5% to 85% (non condensing)
- IP Rating : IP22 (BOAA/BOAC) or IP66 (BOBA/BOBC) models
- Compass Safe Dist. : HD 15T06 BOxx + HD MMD01-xxx
Standard: TBD Steering: TBD

To prevent heat to build up inside the display we recommend installing the unit in a vertical position +/- 40 degrees maximum. We also recommend adding forced cooling in applications where; Vertical mounting angle is above +/- 40 degrees -- Operating temperature is above 25C -- Ventilation area around unit is restricted. Fans should be mounted to enhance natural airflow directed upwards through the unit.

Safety Considerations:

Even although the test conditions for bridge units provide for a maximum operating temperature of 55°C, continuous operation of all electronic components should, if possible, take place at ambient temperatures of only 25°C. This is a necessary prerequisite for long life and low service costs.

Available Options/Accessories:

- VSD100507-1 Split Cable RS422/485 - MALE to 2 x FEMALE 9P D-SUB
- Resistive Factory Mounted Touchscreen (BOAC/BOBC+Cxx Backpack)4wire
- HD VESA 15TBR-A1 - VESA bracket for complete unit
- HD 15TBR CMB-A1 - Console Mounting Bracket for complete unit

NOTE: Products with factory mounted touchscreen is not type approved

TESTING/APPROVALS & CERTIFICATES

This product have been tested / type approved by the following classification societies:

EN60945 4th (IEC945 4th)*
IACS E10*

DNV - Det Norske Veritas
BV - Bureau Veritas

ABS - American Bureau of Shipping
GL - Germanischer Lloyd

ClassNK - Nippon Kaiji Kyokai

*Testing not actually performed, but 15 inch is covered within range by 12 and 19 inch test report.

Specifications - HD 15T06 FOxx + HD MMD01-xxx

TECHNICAL DESCRIPTION

TFT Characteristics:

- TFT Technology : Color Active Matrix LCD Module
a-Si Thin Film Transistor (TFT)
- TFT Size : 15.0 inch
- Pixel Number : 1024 x 768
- Pixel Pitch (RGB) : 0.297 (H) x 0.297 (V) mm
- Response Time : 30 ms (TYP) - black to white to black
- Contrast Ratio : 350:1 (TYP)
- Light Intensity : 600 cd/m² (TYP)
- Viewable Angle : 45° (Up), 55° (Down), 60° (Left/Right) (TYP)
- Active Display Area : 304.1 (H) x 228.1 (V) mm
- Max Colors : 16.7 millions

Synchronisation & Signals:

Analog RGB1 & RGB2:

- Separate, composite synchronisation & synchronisation on green.
- Interlaced and non interlaced
- Auto detects VGA -> UXGA
- VGA : 640 x 480 (including 640 x 350)
- SVGA : 800 x 600 (including 720 x 400)
- XGA : 1024 x 768 (Recommended @ 60Hz)
- SXGA : 1280 x 1024
- UXGA : 1600 x 1200
- Sync. Range Horizontal : See "Preset Signal Timings" in user manual.
- Sync. Range Vertical : See "Preset Signal Timings" in user manual.

DVI:

- Auto detects VGA -> XGA

Composite & S-Video:

- Interlaced PAL / NTSC / SECAM

Power Specifications:

Power Supply Options & Type Numbers:

- 115&230VAC - 50/60Hz : HD 15T06 FOxx + HD MMD01-xx1
- 24 VDC : HD 15T06 FOxx + HD MMD01-xx2

Power Consumption:

- Operating : 35W (Max) (Brightness @ 100%)

Note: All specifications are subject to change without prior notice!

MECHANICAL DESCRIPTION

Physical Considerations:

- 359 (W) x 307 (H) x 75 (D) mm (with flange)
- Weight: 7.5kg (approx)

User I/O Ports:

Behind Rubber Hatch - Front (FOAA / FOAC only):

- USB IN : 1 x USB TYPE A (for loopthrough)

Backpack:

- DVI-I Signal IN : 1 x 24Pin DVI-I (or as RGB IN with adapter)
- RGB Signal IN : 1 x 15Pin HD D-SUB (female)
- Comp. Video IN : 1 x RCA Phono (female)
- S-Video IN : 1 x SVHS S-Video (female)
- USB OUT : 1 x USB TYPE B (for loopthrough)
- COM1 RS232 : 1 x D-SUB 9P (female) (Serial Contr. Interface)
- If AC Power IN : 1 x Std IEC Inlet (female)
- If DC Power IN : 1 x Screw Terminals

Optional Solutions:

- COM2 : 1 x D-SUB 9P (female) (Feature Connector)

User Controls - FOBA / FOBC:

- Navigator Push Function : On/Off, OSD Menu, Hotkey
- Navigator +/- Buttons Function : Brightness, Menu Navigator
- Navigator Indicator : Mode Status LEDs

User Controls - FOAA / FOAC:

- Navigator Push Function : On/Off, OSD Menu, Hotkey
- Navigator Rotary Function : Brightness, Menu Navigator
- Navigator Indicator : Mode Status LEDs

Environmental Considerations:

- Operating : Temperature -15 deg. C to +55 deg. C
- Humidity 20% to 85% (non condensing)
- Storage : Temperature -20 deg. C to +60 deg. C
- Humidity 5% to 85% (non condensing)
- IP Rating : IP22 (FOAA/FOAC) or IP66 (FOBA/FOBC) models
- Compass Safe Dist. : HD 15T06 FOxx + HD MMD01-xxx
Standard: TBD Steering: TBD

To prevent heat to build up inside the display we recommend installing the unit in a vertical position +/- 40 degrees maximum. We also recommend adding forced cooling in applications where; Vertical mounting angle is above +/- 40 degrees -- Operating temperature is above 25C -- Ventilation area around unit is restricted. Fans should be mounted to enhance natural airflow directed upwards through the unit.

Safety Considerations:

Even although the test conditions for bridge units provide for a maximum operating temperature of 55°C, continuous operation of all electronic components should, if possible, take place at ambient temperatures of only 25°C. This is a necessary prerequisite for long life and low service costs.

Available Options/Accessories:

- Resistive Factory Mounted Touchscreen (FOAC/FOBC+Cxx Backpack)4wire
- VSD100507-1 Split Cable RS422/485 - MALE to 2 x FEMALE 9P D-SUB

NOTE: Products with factory mounted touchscreen is not type approved

TESTING / APPROVALS & CERTIFICATES

This product have been tested / type approved by the following classification societies:

Specifications - HD 15T06 COxx + HD MMD01-xxx

TECHNICAL DESCRIPTION

TFT Characteristics:

- TFT Technology : Color Active Matrix LCD Module
a-Si Thin Film Transistor (TFT)
- TFT Size : 15.0 inch
- Pixel Number : 1024 x 768
- Pixel Pitch (RGB) : 0.297 (H) x 0.297 (V) mm
- Response Time : 30 ms (TYP) - black to white to black
- Contrast Ratio : 350:1 (TYP)
- Light Intensity : 600 cd/m² (TYP)
- Viewable Angle : 45°(Up), 55°(Down), 60°(Left/Right) (TYP)
- Active Display Area : 304.1 (H) x 228.1 (V) mm
- Max Colors : 16.7 millions

Synchronisation & Signals:

Analog RGB1 & RGB2:

- Separate, composite synchronisation & synchronisation on green.
- Interlaced and non interlaced
- Auto detects VGA -> UXGA
- VGA : 640 x 480 (including 640 x 350)
- SVGA : 800 x 600 (including 720 x 400)
- XGA : 1024 x 768 (Recommended @ 60Hz)
- SXGA : 1280 x 1024
- UXGA : 1600 x 1200
- Sync. Range Horizontal : See "Preset Signal Timings" in user manual.
- Sync. Range Vertical : See "Preset Signal Timings" in user manual.

DVI:

- Auto detects VGA -> XGA

Composite & S-Video:

- Interlaced PAL / NTSC / SECAM

Power Specifications:

Power Supply Options & Type Numbers:

- 115&230VAC - 50/60Hz : HD 15T06 COxx + HD MMD01-xx1
- 24 VDC : HD 15T06 COxx + HD MMD01-xx2

Power Consumption:

- Operating : 35W (Max) (Brightness @ 100%)

Note: All specifications are subject to change without prior notice!

MECHANICAL DESCRIPTION

Physical Considerations:

- 385 (W) x 333 (H) x 75 (D) mm (with flange)
- Weight: 7.5kg (approx)

User I/O Ports:

Behind Rubber Hatch - Front (COAA / COAC only):

- USB IN : 1 x USB TYPE A (for loophthrough)

Backpack:

- DVI-I Signal IN : 1 x 24Pin DVI-I (or as RGB IN with adapter)
- RGB Signal IN : 1 x 15Pin HD D-SUB (female)
- Comp. Video IN : 1 x RCA Phono (female)
- S-Video IN : 1 x SVHS S-Video (female)
- USB OUT : 1 x USB TYPE B (for loophthrough)
- COM1 RS232 : 1 x D-SUB 9P (female) (Serial Contr. Interface)
- If AC Power IN : 1 x Std IEC Inlet (female)
- If DC Power IN : 1 x Screw Terminals

Optional Solutions:

- COM2 : 1 x D-SUB 9P (female) (Feature Connector)

User Controls - COBA / COBC:

- Navigator Push Function : On/Off, OSD Menu, Hotkey
- Navigator +/- Buttons Function : Brightness, Menu Navigator
- Navigator Indicator : Mode Status LEDs

User Controls - COAA / COAC:

- Navigator Push Function : On/Off, OSD Menu, Hotkey
- Navigator Rotary Function : Brightness, Menu Navigator
- Navigator Indicator : Mode Status LEDs

Environmental Considerations:

- Operating : Temperature -15 deg. C to +55 deg. C
- Humidity 20% to 85% (non condensing)
- Storage : Temperature -20 deg. C to +60 deg. C
- Humidity 5% to 85% (non condensing)
- IP Rating : IP22 (COAA/COAC) or IP66 (COBA/COBC) models
- Compass Safe Dist. : HD 15T06 COxx + HD MMD01-xxx
Standard: TBD Steering: TBD

To prevent heat to build up inside the display we recommend installing the unit in a vertical position +/- 40 degrees maximum. We also recommend adding forced cooling in applications where; Vertical mounting angle is above +/- 40 degrees -- Operating temperature is above 25C -- Ventilation area around unit is restricted. Fans should be mounted to enhance natural airflow directed upwards through the unit.

Safety Considerations:

Even although the test conditions for bridge units provide for a maximum operating temperature of 55°C, continuous operation of all electronic components should, if possible, take place at ambient temperatures of only 25°C. This is a necessary prerequisite for long life and low service costs.

Available Options/Accessories:

- Resistive Factory Mounted Touchscreen (COAC/COBC+Cxx Backpack)4wire
- VSD100507-1 Split Cable RS422/485 - MALE to 2 x FEMALE 9P D-SUB

NOTE: Products with factory mounted touchscreen is not type approved

TESTING/APPROVALS & CERTIFICATES

This product have been tested / type approved by the following classification societies:

EN60945 4th (IEC945 4th)*
IACS E10*

DNV - Det Norske Veritas
BV - Bureau Veritas

ABS - American Bureau of Shipping
GL - Germanischer Lloyd

ClassNK - Nippon Kaiji Kyokai

*Testing not actually performed, but 15 inch is covered within range by 12 and 19 inch test report.

Specifications - HD 19T03 BOxx + HD MMD01-xxx

TECHNICAL DESCRIPTION

TFT Characteristics:

- TFT Technology : Color Active Matrix LCD Module
MVA Premium™ Technology (TFT)
- TFT Size : 19.0 inch
- Pixel Number : 1280 x 1024
- Pixel Pitch (RGB) : 0.294 (H) x 0.294 (V) mm
- Response Time : 12 ms (TYP) - black to white to black
- Contrast Ratio : 600:1 (TYP)
- Light Intensity : 450 cd/m² (TYP)
- Viewable Angle : 89°(Up/Down/Left/Right) (TYP)
- Active Display Area : 376.32 (H) x 301.056 (V) mm
- Max Colors : 16.7 millions

Synchronisation & Signals:

Analog RGB1 & RGB2:

- Separate, composite synchronisation & synchronisation on green.
- Interlaced and non interlaced
- Auto detects VGA -> UXGA
- VGA : 640 x 480 (including 640 x 350)
- SVGA : 800 x 600 (including 720 x 400)
- XGA : 1024 x 768
- SXGA : 1280 x 1024 (Recommended @ 60Hz)
- UXGA : 1600 x 1200
- Sync. Range Horizontal : See "Preset Signal Timings" in user manual.
- Sync. Range Vertical : See "Preset Signal Timings" in user manual.

DVI:

- Auto detects VGA -> XGA

Composite & S-Video:

- Interlaced PAL / NTSC / SECAM

Power Specifications:

Power Supply Options & Type Numbers:

- 115&230VAC - 50/60Hz : HD 19T03 BOxx + HD MMD01-xx1
- 24 VDC : HD 19T03 BOxx + HD MMD01-xx2

Power Consumption:

- Operating : 66W (Max) (Brightness @ 100%)

Note: All specifications are subject to change without prior notice!

MECHANICAL DESCRIPTION

Physical Considerations:

- 416 (W) x 372 (H) x 75 (D) mm (without bracket)
- 416 (W) x 363 (H) x 167 (D) mm (with bracket)
- Weight: 9kg (approx)

User I/O Ports:

Behind Rubber Hatch - Front (BOAA / BOAC only):

- USB IN : 1 x USB TYPE A (for loophthrough)

Backpack:

- DVI-I Signal IN : 1 x 24Pin DVI-I (or as RGB IN with adapter)
- RGB Signal IN : 1 x 15Pin HD D-SUB (female)
- Comp. Video IN : 1 x RCA Phono (female)
- S-Video IN : 1 x SVHS S-Video (female)
- USB OUT : 1 x USB TYPE B (for loophthrough)
- COM1 RS232 : 1 x D-SUB 9P (female) (Serial Contr. Interface)
- If AC Power IN : 1 x Std IEC Inlet (female)
- If DC Power IN : 1 x Screw Terminals

Optional Solutions:

- COM2 : 1 x D-SUB 9P (female) (Feature Connector)

User Controls - BOAA / BOAC:

- Navigator Push Function : On/Off, OSD Menu, Hotkey
- Navigator Rotary Function : Brightness, Menu Navigator
- Navigator Indicator : Mode Status LEDs

User Controls - BOBA / BOBC:

- Navigator Push Function : On/Off, OSD Menu, Hotkey
- Navigator +/- Buttons Function : Brightness, Menu Navigator
- Navigator Indicator : Mode Status LEDs

Environmental Considerations:

- Operating : Temperature -15 deg. C to +55 deg. C
- Humidity 20% to 85% (non condensing)
- Storage : Temperature -20 deg. C to +60 deg. C
- Humidity 5% to 85% (non condensing)
- IP Rating : IP22 (BOAA/BOAC) or IP66 (BOBA/BOBC) models
- Compass Safe Dist. : HD 19T03 BOxx + HD MMD01-xxx
Standard: 80cm Steering: 50cm

To prevent heat to build up inside the display we recommend installing the unit in a vertical position +/- 40 degrees maximum. We also recommend adding forced cooling in applications where; Vertical mounting angle is above +/- 40 degrees -- Operating temperature is above 25C -- Ventilation area around unit is restricted. Fans should be mounted to enhance natural airflow directed upwards through the unit.

Safety Considerations:

Even although the test conditions for bridge units provide for a maximum operating temperature of 55°C, continuous operation of all electronic components should, if possible, take place at ambient temperatures of only 25°C. This is a necessary prerequisite for long life and low service costs.

Available Options/Accessories:

- VSD100507-1 Split Cable RS422/485 - MALE to 2 x FEMALE 9P D-SUB
- Resistive Factory Mounted Touchscreen (BOAC/BOBC+Cxx Backpack)4wire
- HD VESA 19TBR-A1 - VESA bracket for complete unit
- HD 19TBR CMB-A1 - Console Mounting Bracket for complete unit

NOTE: Products with factory mounted touchscreen is not type approved

TESTING/APPROVALS & CERTIFICATES

This product have been tested / type approved by the following classification societies:

EN60945 4th (IEC945 4th)
IACS E10

DNV - Det Norske Veritas
BV - Bureau Veritas

ABS - American Bureau of Shipping
GL - Germanischer Lloyd

ClassNK - Nippon Kaiji Kyokai

Specifications - HD 19T03 FOxx + HD MMD01-xxx

TECHNICAL DESCRIPTION

TFT Characteristics:

- TFT Technology : Color Active Matrix LCD Module
MVA Premium™ Technology (TFT)
- TFT Size : 19.0 inch
- Pixel Number : 1280 x 1024
- Pixel Pitch (RGB) : 0.294 (H) x 0.294 (V) mm
- Response Time : 12 ms (TYP) - black to white to black
- Contrast Ratio : 600:1 (TYP)
- Light Intensity : 450 cd/m² (TYP)
- Viewable Angle : 89° (Up/Down/Left/Right) (TYP)
- Active Display Area : 376.32 (H) x 301.056 (V) mm
- Max Colors : 16.7 millions

Synchronisation & Signals:

Analog RGB1 & RGB2:

- Separate, composite synchronisation & synchronisation on green.
- Interlaced and non interlaced
- Auto detects VGA -> UXGA
- VGA : 640 x 480 (including 640 x 350)
- SVGA : 800 x 600 (including 720 x 400)
- XGA : 1024 x 768
- SXGA : 1280 x 1024 (Recommended @ 60Hz)
- UXGA : 1600 x 1200
- Sync. Range Horizontal : See "Preset Signal Timings" in user manual.
- Sync. Range Vertical : See "Preset Signal Timings" in user manual.

DVI:

- Auto detects VGA -> XGA

Composite & S-Video:

- Interlaced PAL / NTSC / SECAM

Power Specifications:

Power Supply Options & Type Numbers:

- 115&230VAC - 50/60Hz : HD 19T03 FOxx + HD MMD01-xx1
- 24 VDC : HD 19T03 FOxx + HD MMD01-xx2

Power Consumption:

- Operating : 66W (Max) (Brightness @ 100%)

Note: All specifications are subject to change without prior notice!

MECHANICAL DESCRIPTION

Physical Considerations:

- 431 (W) x 387 (H) x 75 (D) mm (with flange)
- Weight: 9kg (approx)

User I/O Ports:

Behind Rubber Hatch - Front (FOAA / FOAC only):

- USB IN : 1 x USB TYPE A (for loopthrough)

Backpack:

- DVI-I Signal IN : 1 x 24Pin DVI-I (or as RGB IN with adapter)
- RGB Signal IN : 1 x 15Pin HD D-SUB (female)
- Comp. Video IN : 1 x RCA Phono (female)
- S-Video IN : 1 x SVHS S-Video (female)
- USB OUT : 1 x USB TYPE B (for loopthrough)
- COM1 RS232 : 1 x D-SUB 9P (female) (Serial Contr. Interface)
- If AC Power IN : 1 x Std IEC Inlet (female)
- If DC Power IN : 1 x Screw Terminals

Optional Solutions:

- COM2 : 1 x D-SUB 9P (female) (Feature Connector)

User Controls - FOBA / FOBC:

- Navigator Push Function : On/Off, OSD Menu, Hotkey
- Navigator +/- Buttons Function : Brightness, Menu Navigator
- Navigator Indicator : Mode Status LEDs

User Controls - FOAA / FOAC:

- Navigator Push Function : On/Off, OSD Menu, Hotkey
- Navigator Rotary Function : Brightness, Menu Navigator
- Navigator Indicator : Mode Status LEDs

Environmental Considerations:

- Operating : Temperature -15 deg. C to +55 deg. C
- Humidity 20% to 85% (non condensing)
- Storage : Temperature -20 deg. C to +60 deg. C
- Humidity 5% to 85% (non condensing)
- IP Rating : IP22 (FOAA/FOAC) or IP66 (FOBA/FOBC) models
- Compass Safe Dist. : HD 19T03 FOxx + HD MMD01-xxx
Standard: 80cm Steering: 50cm

To prevent heat to build up inside the display we recommend installing the unit in a vertical position +/- 40 degrees maximum. We also recommend adding forced cooling in applications where; Vertical mounting angle is above +/- 40 degrees -- Operating temperature is above 25C -- Ventilation area around unit is restricted. Fans should be mounted to enhance natural airflow directed upwards through the unit.

Safety Considerations:

Even although the test conditions for bridge units provide for a maximum operating temperature of 55°C, continuous operation of all electronic components should, if possible, take place at ambient temperatures of only 25°C. This is a necessary prerequisite for long life and low service costs.

Available Options/Accessories:

- Resistive Factory Mounted Touchscreen (FOAC/FOBC+Cxx Backpack)4wire
- VSD100507-1 Split Cable RS422/485 - MALE to 2 x FEMALE 9P D-SUB

NOTE: Products with factory mounted touchscreen is not type approved

TESTING / APPROVALS & CERTIFICATES

This product have been tested / type approved by the following classification societies:

Specifications - HD 19T03 COxx + HD MMD01-xxx

TECHNICAL DESCRIPTION

TFT Characteristics:

- TFT Technology : Color Active Matrix LCD Module
MVA Premium™ Technology (TFT)
- TFT Size : 19.0 inch
- Pixel Number : 1280 x 1024
- Pixel Pitch (RGB) : 0.294 (H) x 0.294 (V) mm
- Response Time : 12 ms (TYP) - black to white to black
- Contrast Ratio : 600:1 (TYP)
- Light Intensity : 450 cd/m² (TYP)
- Viewable Angle : 89° (Up/Down/Left/Right) (TYP)
- Active Display Area : 376.32 (H) x 301.056 (V) mm
- Max Colors : 16.7 millions

Synchronisation & Signals:

Analog RGB1 & RGB2:

- Separate, composite synchronisation & synchronisation on green.
- Interlaced and non interlaced
- Auto detects VGA -> UXGA
- VGA : 640 x 480 (including 640 x 350)
- SVGA : 800 x 600 (including 720 x 400)
- XGA : 1024 x 768
- SXGA : 1280 x 1024 (Recommended @ 60Hz)
- UXGA : 1600 x 1200
- Sync. Range Horizontal : See "Preset Signal Timings" in user manual.
- Sync. Range Vertical : See "Preset Signal Timings" in user manual.

DVI:

- Auto detects VGA -> XGA

Composite & S-Video:

- Interlaced PAL / NTSC / SECAM

Power Specifications:

Power Supply Options & Type Numbers:

- 115&230VAC - 50/60Hz : HD 19T03 COxx + HD MMD01-xx1
- 24 VDC : HD 19T03 COxx + HD MMD01-xx2

Power Consumption:

- Operating : 66W (Max) (Brightness @ 100%)

Note: All specifications are subject to change without prior notice!

MECHANICAL DESCRIPTION

Physical Considerations:

- 457 (W) x 413 (H) x 75 (D) mm (with flange)
- Weight: 9kg (approx)

User I/O Ports:

Behind Rubber Hatch - Front (COAA / COAC only):

- USB IN : 1 x USB TYPE A (for loopthrough)

Backpack:

- DVI-I Signal IN : 1 x 24Pin DVI-I (or as RGB IN with adapter)
- RGB Signal IN : 1 x 15Pin HD D-SUB (female)
- Comp. Video IN : 1 x RCA Phono (female)
- S-Video IN : 1 x SVHS S-Video (female)
- USB OUT : 1 x USB TYPE B (for loopthrough)
- COM1 RS232 : 1 x D-SUB 9P (female) (Serial Contr. Interface)
- If AC Power IN : 1 x Std IEC Inlet (female)
- If DC Power IN : 1 x Screw Terminals

Optional Solutions:

- COM2 : 1 x D-SUB 9P (female) (Feature Connector)

User Controls - COBA / COBC:

- Navigator Push Function : On/Off, OSD Menu, Hotkey
- Navigator +/- Buttons Function : Brightness, Menu Navigator
- Navigator Indicator : Mode Status LEDs

User Controls - COAA / COAC:

- Navigator Push Function : On/Off, OSD Menu, Hotkey
- Navigator Rotary Function : Brightness, Menu Navigator
- Navigator Indicator : Mode Status LEDs

Environmental Considerations:

- Operating : Temperature -15 deg. C to +55 deg. C
- Humidity 20% to 85% (non condensing)
- Storage : Temperature -20 deg. C to +60 deg. C
- Humidity 5% to 85% (non condensing)
- IP Rating : IP22 (COAA/COAC) or IP66 (COBA/COBC) models
- Compass Safe Dist. : HD 19T03 COxx + HD MMD01-xxx
Standard: 80cm Steering: 50cm

To prevent heat to build up inside the display we recommend installing the unit in a vertical position +/- 40 degrees maximum. We also recommend adding forced cooling in applications where; Vertical mounting angle is above +/- 40 degrees -- Operating temperature is above 25C -- Ventilation area around unit is restricted. Fans should be mounted to enhance natural airflow directed upwards through the unit.

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Available Options/Accessories:

- Resistive Factory Mounted Touchscreen (COAC/COBC+Cxx Backpack)4wire
- VSD100507-1 Split Cable RS422/485 - MALE to 2 x FEMALE 9P D-SUB

NOTE: Products with factory mounted touchscreen is not type approved

TESTING/APPROVALS & CERTIFICATES

This product have been tested / type approved by the following classification societies:

EN60945 4th (IEC945 4th)
IACS E10

DNV - Det Norske Veritas
BV - Bureau Veritas

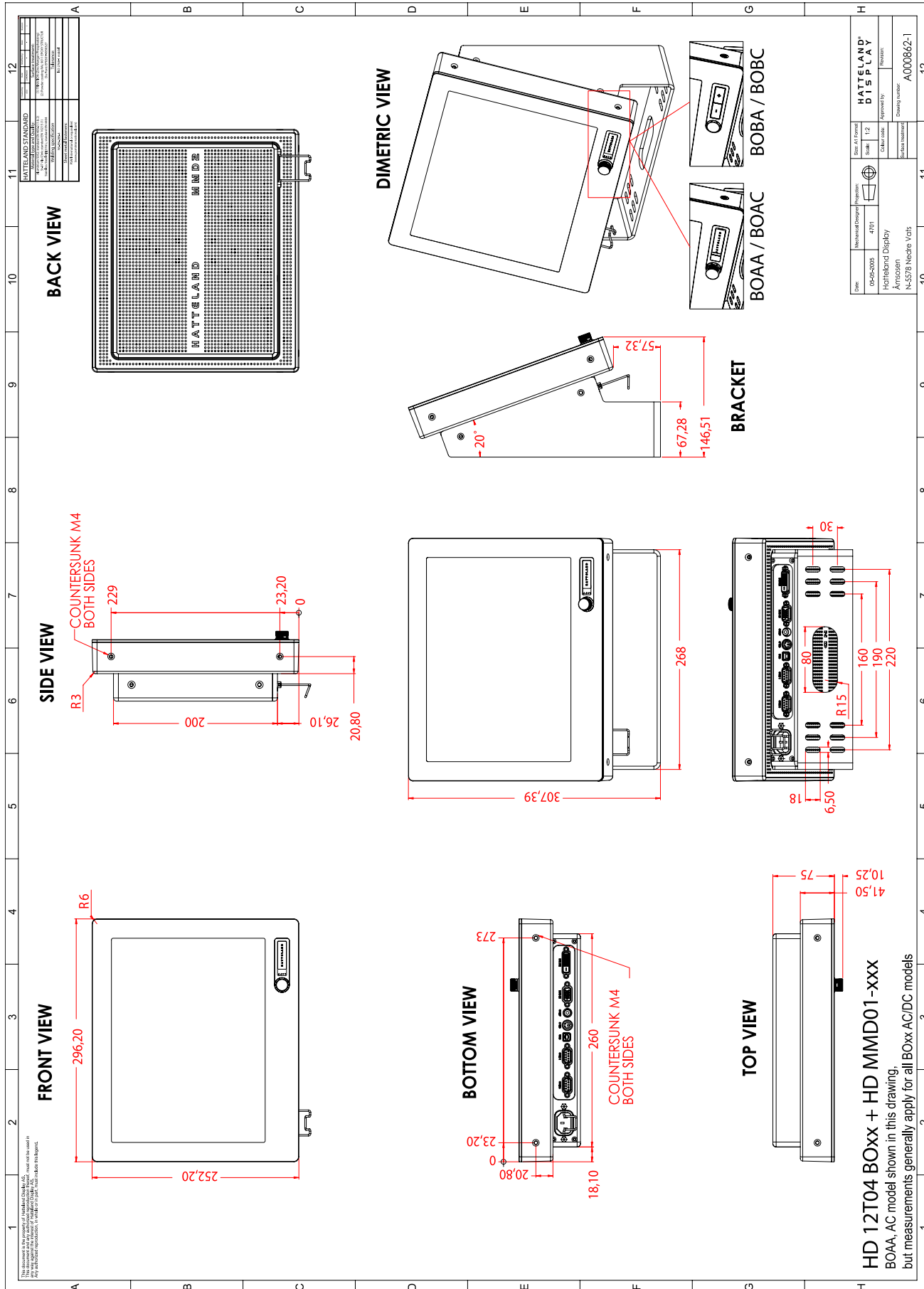
ABS - American Bureau of Shipping
GL - Germanischer Lloyd

ClassNK - Nippon Kaiji Kyokai

Technical Drawings

Technical Drawings - HD 12T04 BOxx + HD MMD01-xxx

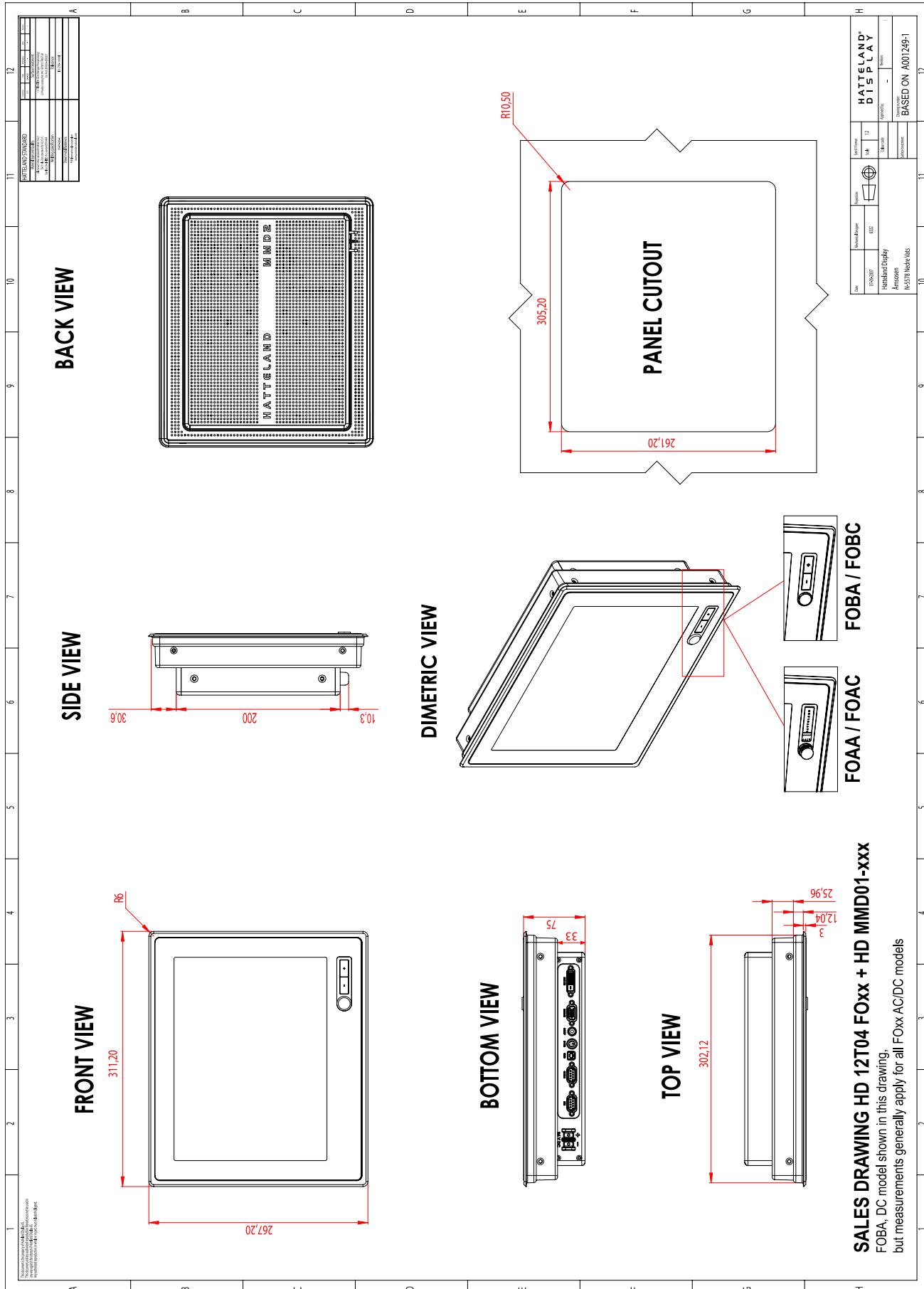
Dimensions might be shown with or without decimals. Tolerance on drawings is +/- 1mm. For accurate measurements, use relevant DWG file available from Hatteland Display AS



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Technical Drawings - HD 12T04 FOxx + HD MMD01-xxx

Dimensions might be shown with or without decimals. Tolerance on drawings is +/- 1mm. For accurate measurements, use relevant DWG file available from Hatteland Display AS



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FRONT VIEW

BACK VIEW

EXPLODED VIEW

SIDE VIEW

BOTTOM VIEW

TOP VIEW

Tapped M6 with Unbrako 5mm head

M6 Tapped hole

Panel

Tighten screw towards panel

HATTELAND® DISPLAY

Model: HMD01-xxx

Weight: 1.2kg

Dimensions: 1200mm x 700mm x 40mm

Material: Aluminum

Finish: Powder Coat

Color: Black

Mounting: VESA 100x100

Power: 12VDC

Power Consumption: 10W

Operating Temperature: -10°C to 50°C

Storage Temperature: -20°C to 60°C

Humidity: 10% to 90% RH

Shock: 10g

Vibration: 10g

EMC: CE

RoHS: Compliant

Warranty: 3 Years

Based on A001249-1

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FRONT VIEW

337,20
293,20
R6,00
Ø 5,50 THRU ALL
Ø 10,50 X 90°

BACK VIEW

SIDE VIEW

261,20

TOP VIEW

305,20
75,00
1,75
41,50
3,00

BOTTOM VIEW

DIMETRIC VIEW

PANEL CUT OUT

305,20
85,10
5,88
63,10
5,88
261,20
63,10
5,88
5,50
R10,50
Metric thread M5 or

COBA / COBC

COAA / COAC

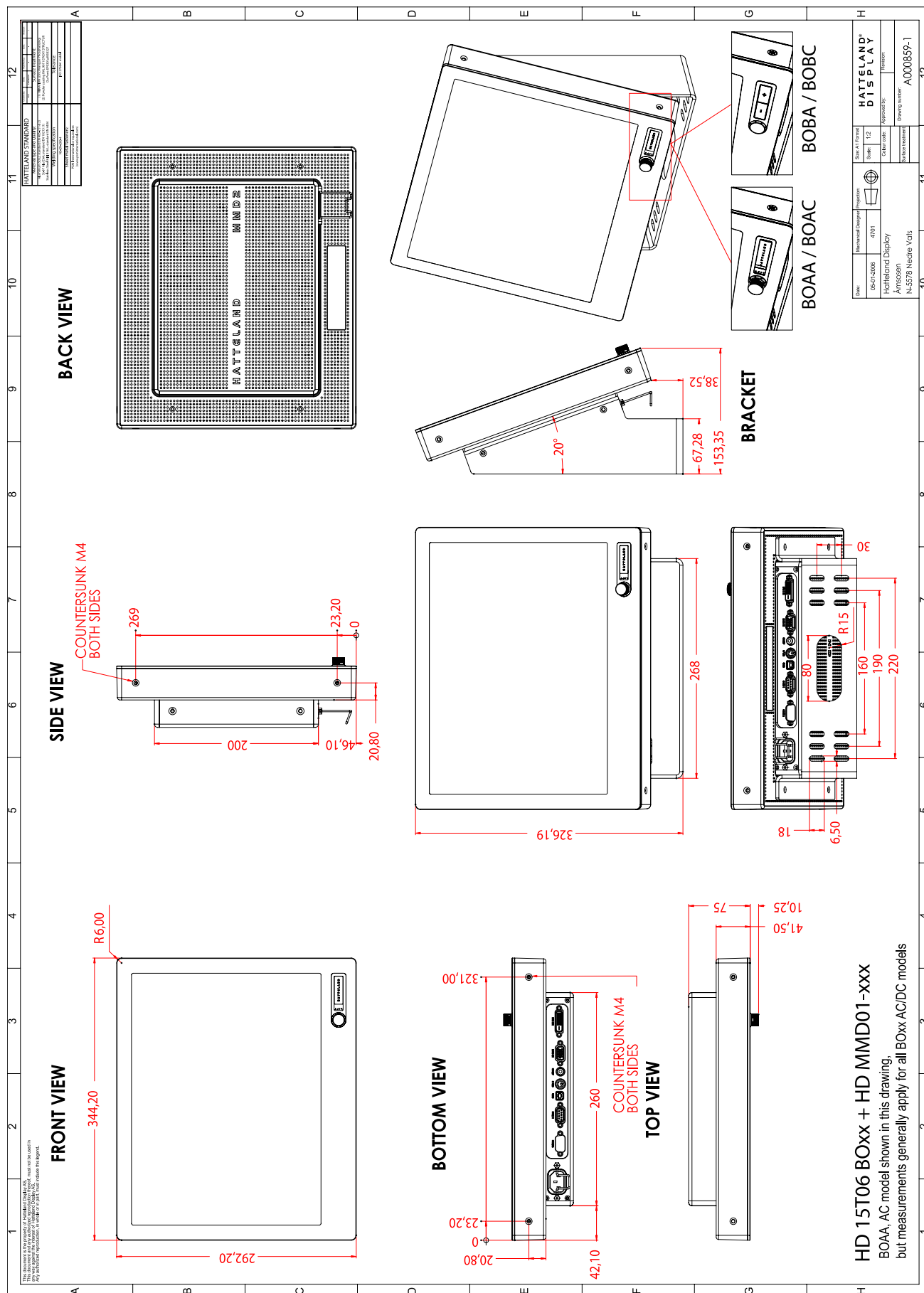
HATTELAND® DISPLAY

Date: 2047-1-2008
Sheet: 1/2
Author: Hatteland Display
Approved by: Hatteland Display
Drawing number: A001046-1

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Technical Drawings - HD 15T06 BOxx + HD MMD01-xxx

Dimensions might be shown with or without decimals. Tolerance on drawings is +/- 1mm. For accurate measurements, use relevant DWG file available from Hatteland Display AS



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FRONT VIEW

307,2

359,2

BACK VIEW

SIDE VIEW

298,1

200

50,6

BOTTOM VIEW

46,6

260

3

TOP VIEW

353,2

33

75

41,5

3,2

DIMETRIC VIEW

PANEL CUT OUT

301,2

353,2

R10,5

FOBA / FOBC

FOAA / FOAC

SALES DRAWING HD 15T06 FOxx + HD MMID01-xxx

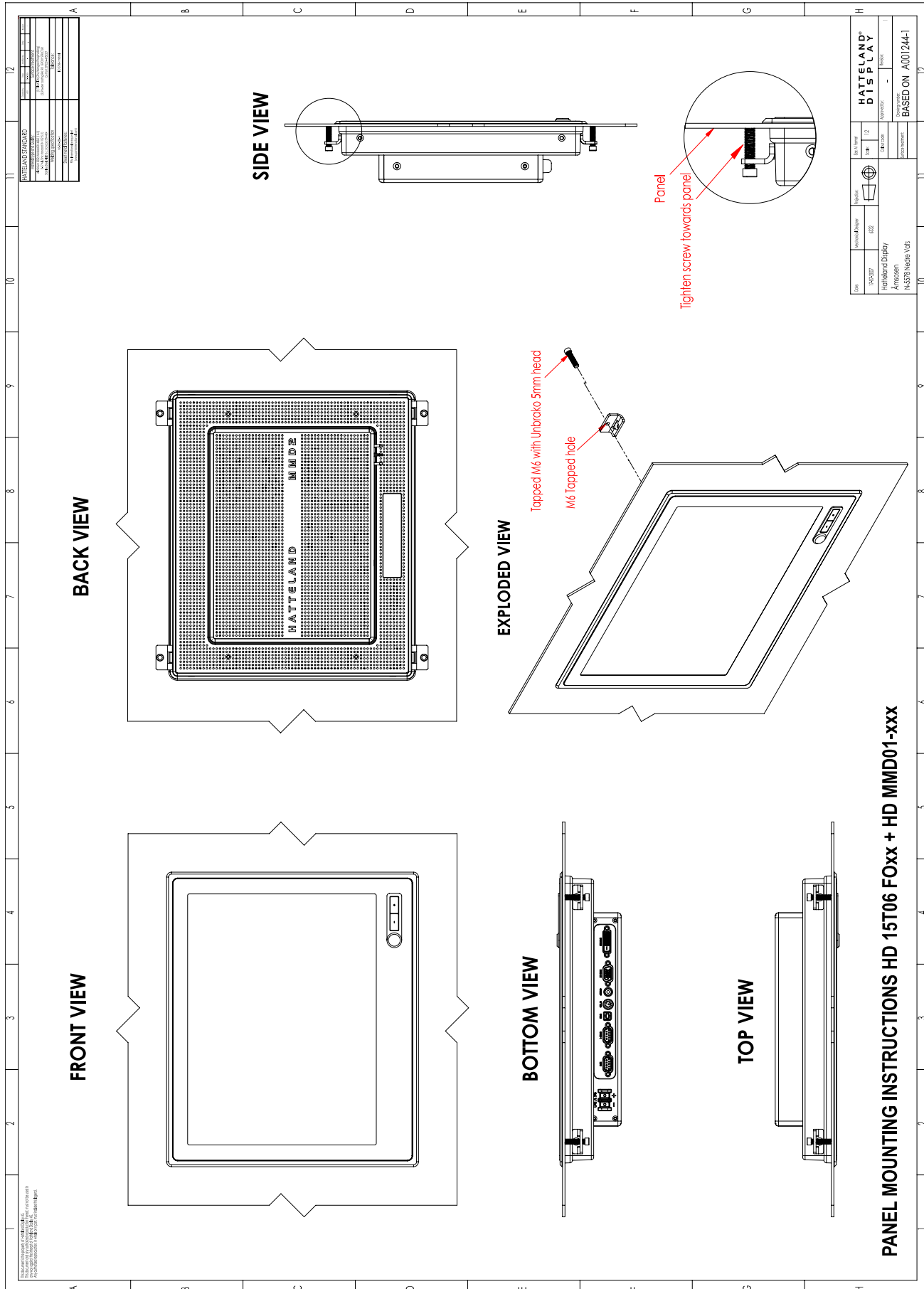
FOBA, DC model shown in this drawing, but measurements generally apply for all FOxx AC/DC models

Model	15T06	15T07	15T08	15T09	15T10	15T11	15T12	15T13	15T14	15T15	15T16	15T17	15T18	15T19	15T20	15T21	15T22	15T23	15T24	15T25	15T26	15T27	15T28	15T29	15T30	15T31	15T32	15T33	15T34	15T35	15T36	15T37	15T38	15T39	15T40	15T41	15T42	15T43	15T44	15T45	15T46	15T47	15T48	15T49	15T50	15T51	15T52	15T53	15T54	15T55	15T56	15T57	15T58	15T59	15T60	15T61	15T62	15T63	15T64	15T65	15T66	15T67	15T68	15T69	15T70	15T71	15T72	15T73	15T74	15T75	15T76	15T77	15T78	15T79	15T80	15T81	15T82	15T83	15T84	15T85	15T86	15T87	15T88	15T89	15T90	15T91	15T92	15T93	15T94	15T95	15T96	15T97	15T98	15T99	15T100
Model	15T06	15T07	15T08	15T09	15T10	15T11	15T12	15T13	15T14	15T15	15T16	15T17	15T18	15T19	15T20	15T21	15T22	15T23	15T24	15T25	15T26	15T27	15T28	15T29	15T30	15T31	15T32	15T33	15T34	15T35	15T36	15T37	15T38	15T39	15T40	15T41	15T42	15T43	15T44	15T45	15T46	15T47	15T48	15T49	15T50	15T51	15T52	15T53	15T54	15T55	15T56	15T57	15T58	15T59	15T60	15T61	15T62	15T63	15T64	15T65	15T66	15T67	15T68	15T69	15T70	15T71	15T72	15T73	15T74	15T75	15T76	15T77	15T78	15T79	15T80	15T81	15T82	15T83	15T84	15T85	15T86	15T87	15T88	15T89	15T90	15T91	15T92	15T93	15T94	15T95	15T96	15T97	15T98	15T99	15T100
Model	15T06	15T07	15T08	15T09	15T10	15T11	15T12	15T13	15T14	15T15	15T16	15T17	15T18	15T19	15T20	15T21	15T22	15T23	15T24	15T25	15T26	15T27	15T28	15T29	15T30	15T31	15T32	15T33	15T34	15T35	15T36	15T37	15T38	15T39	15T40	15T41	15T42	15T43	15T44	15T45	15T46	15T47	15T48	15T49	15T50	15T51	15T52	15T53	15T54	15T55	15T56	15T57	15T58	15T59	15T60	15T61	15T62	15T63	15T64	15T65	15T66	15T67	15T68	15T69	15T70	15T71	15T72	15T73	15T74	15T75	15T76	15T77	15T78	15T79	15T80	15T81	15T82	15T83	15T84	15T85	15T86	15T87	15T88	15T89	15T90	15T91	15T92	15T93	15T94	15T95	15T96	15T97	15T98	15T99	15T100
Model	15T06	15T07	15T08	15T09	15T10	15T11	15T12	15T13	15T14	15T15	15T16	15T17	15T18	15T19	15T20	15T21	15T22	15T23	15T24	15T25	15T26	15T27	15T28	15T29	15T30	15T31	15T32	15T33	15T34	15T35	15T36	15T37	15T38	15T39	15T40	15T41	15T42	15T43	15T44	15T45	15T46	15T47	15T48	15T49	15T50	15T51	15T52	15T53	15T54	15T55	15T56	15T57	15T58	15T59	15T60	15T61	15T62	15T63	15T64	15T65	15T66	15T67	15T68	15T69	15T70	15T71	15T72	15T73	15T74	15T75	15T76	15T77	15T78	15T79	15T80	15T81	15T82	15T83	15T84	15T85	15T86	15T8													

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Technical Drawings - HD 15T06 FOxx + HD MMD01-xxx

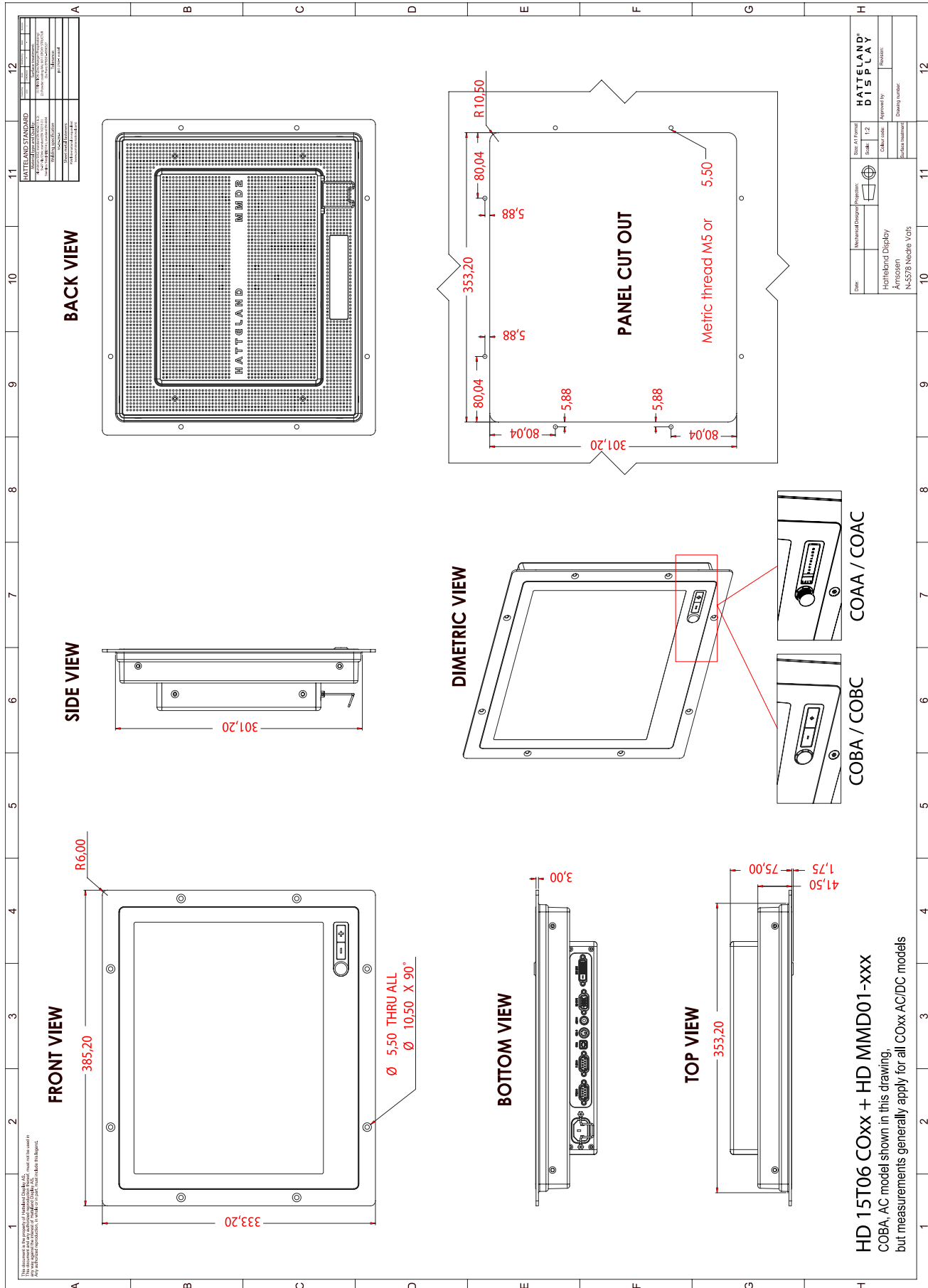
Dimensions might be shown with or without decimals. Tolerance on drawings is +/- 1mm. For accurate measurements, use relevant DWG file available from Hatteland Display AS



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Technical Drawings - HD 15T06 COxx + HD MMD01-xxx

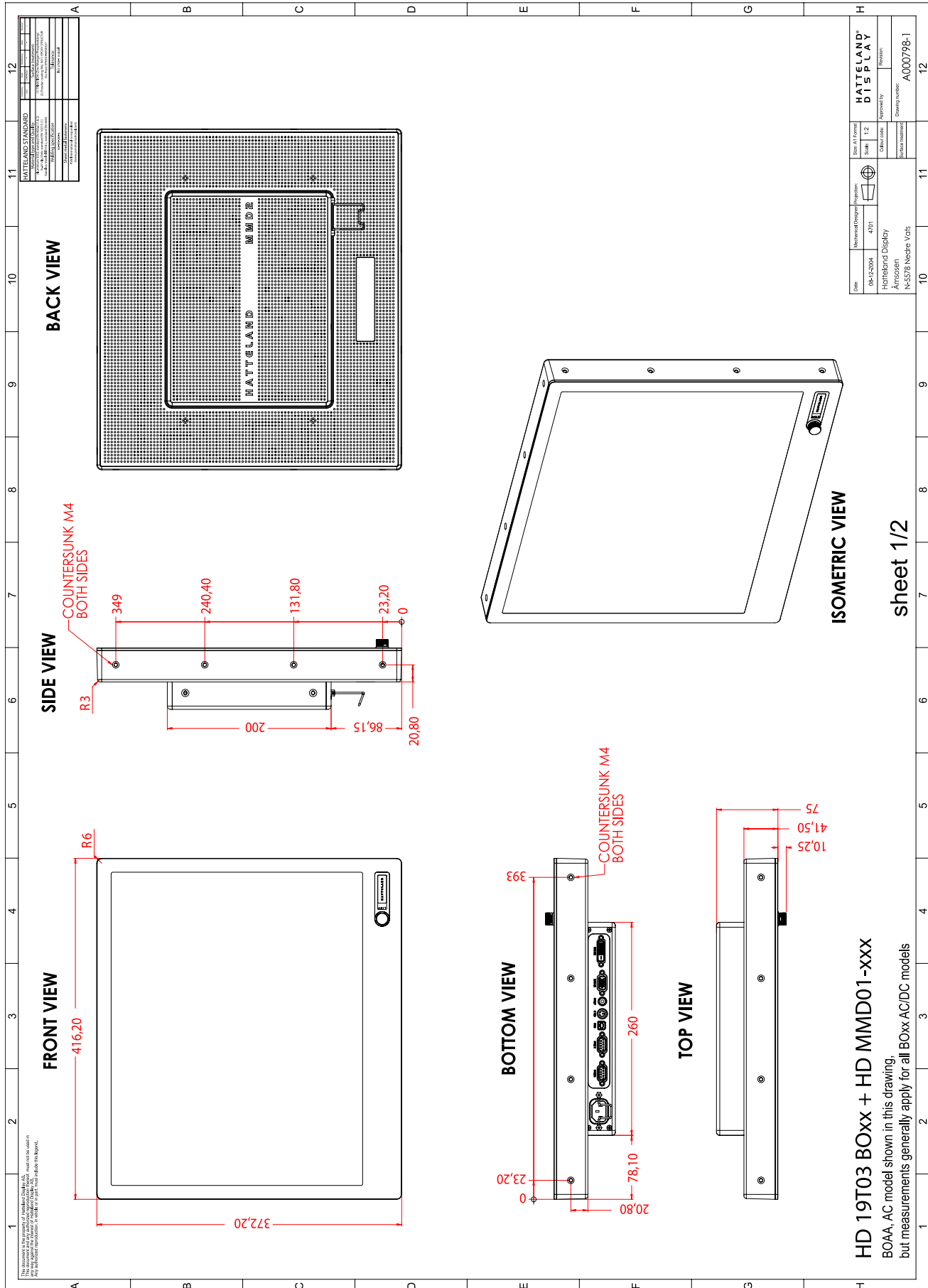
Dimensions might be shown with or without decimals. Tolerance on drawings is +/- 1mm. For accurate measurements, use relevant DWG file available from Hatteland Display AS



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Technical Drawings - HD 19T03 BOxx + HD MMD01-xxx

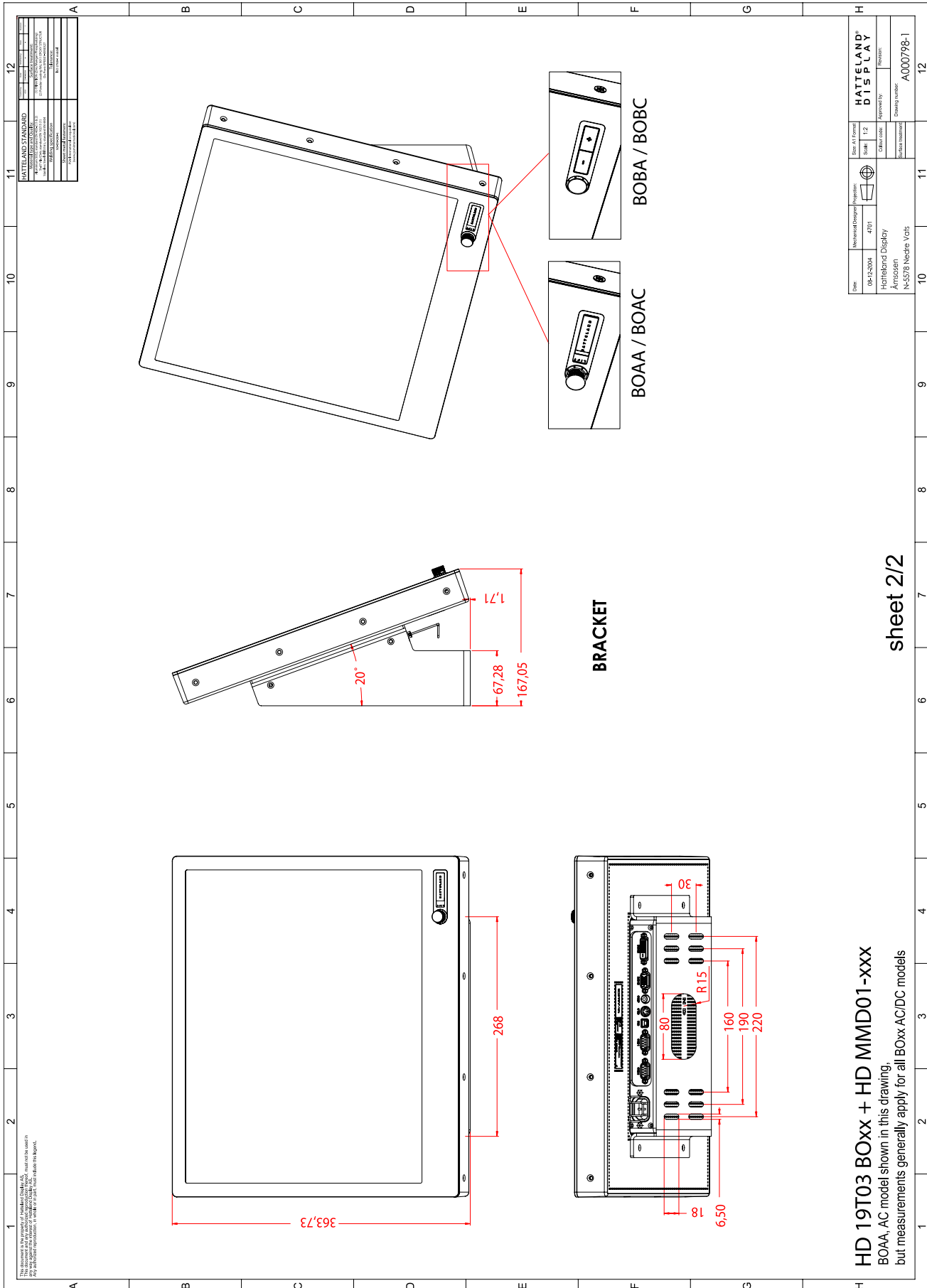
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Technical Drawings - HD 19T03 BOxx + HD MMD01-xxx

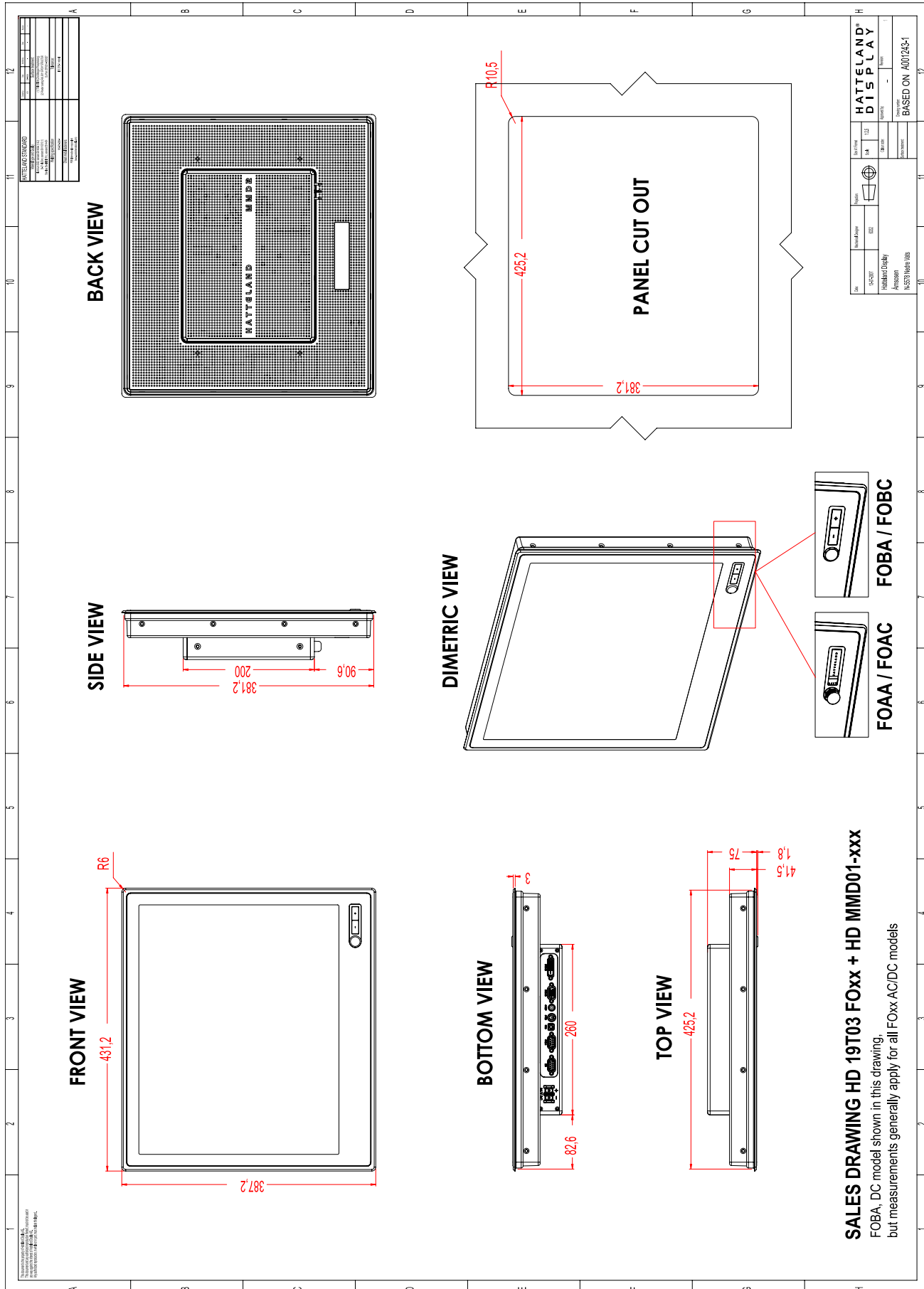
Dimensions might be shown with or without decimals. Tolerance on drawings is +/- 1mm. For accurate measurements, use relevant DWG file available from Hatteland Display AS



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Technical Drawings - HD 19T03 FOxx + HD MMD01-xxx

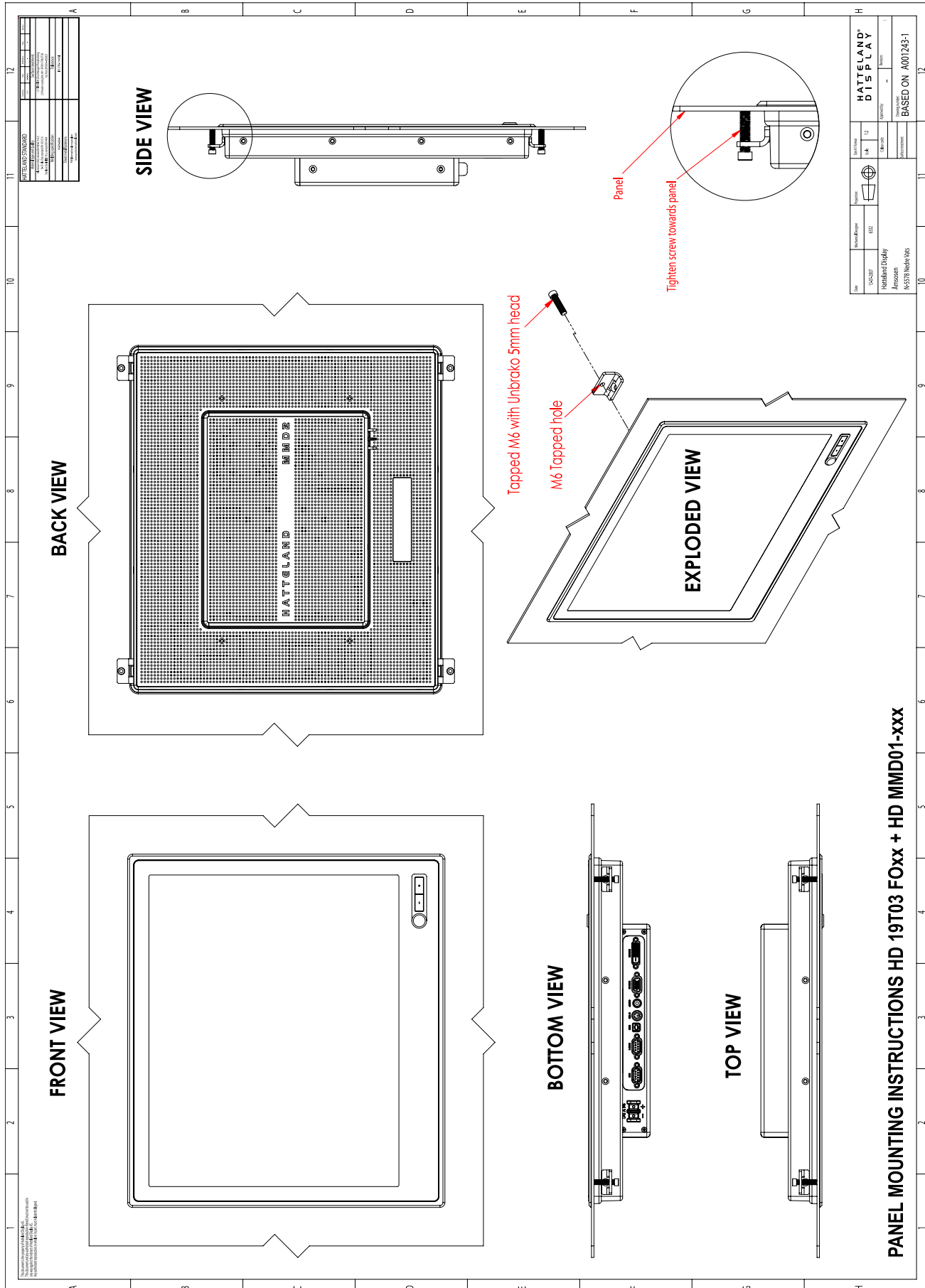
Dimensions might be shown with or without decimals. Tolerance on drawings is +/- 1mm. For accurate measurements, use relevant DWG file available from Hatteland Display AS



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Technical Drawings - HD 19T03 FOxx + HD MMD01-xxx

Dimensions might be shown with or without decimals. Tolerance on drawings is +/- 1mm. For accurate measurements, use relevant DWG file available from Hatteland Display AS



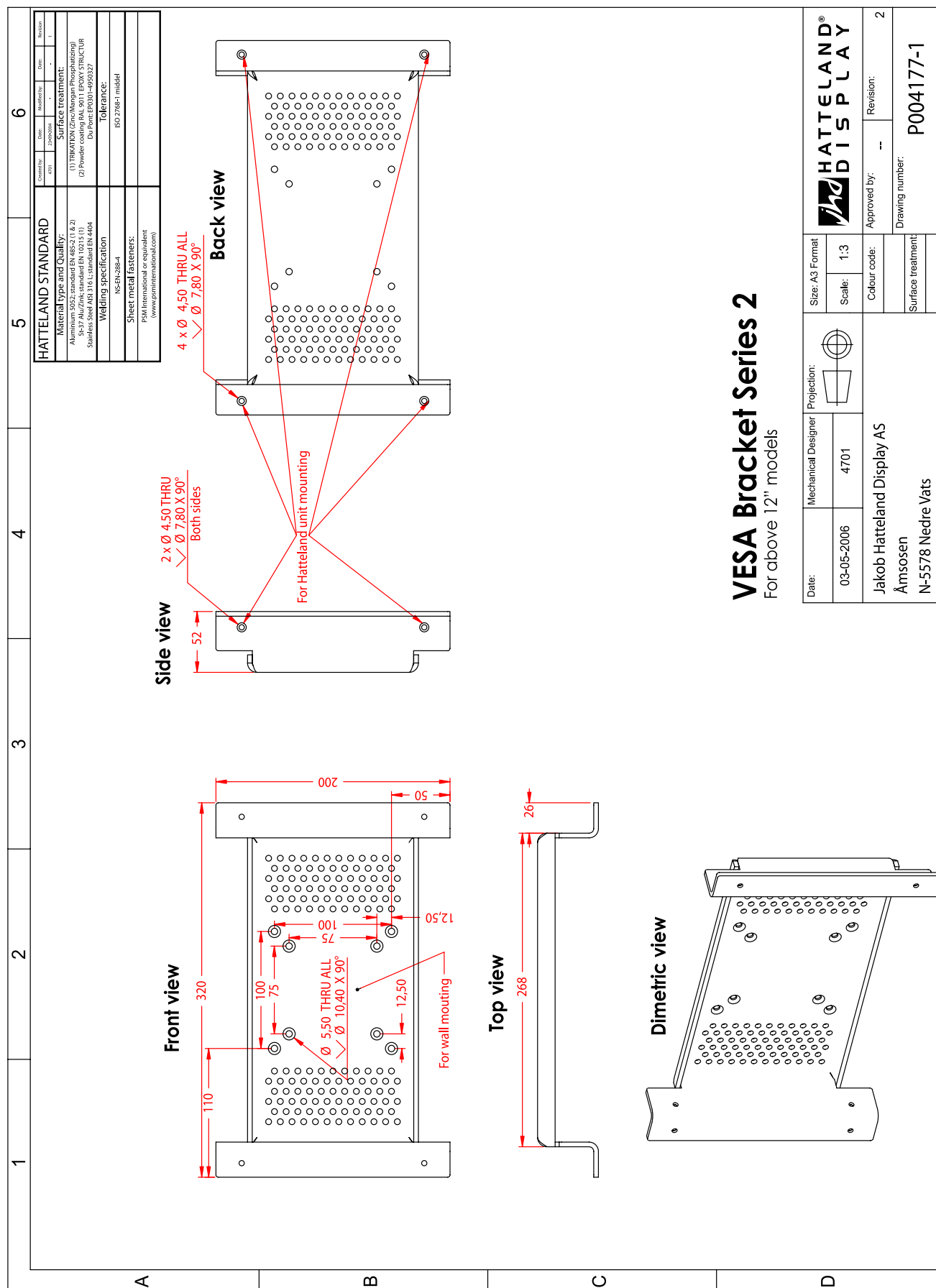
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[illegible]

Console Models

Accessories

Dimensions might be shown with or without decimals. Tolerance on drawings is +/- 1mm. For accurate measurements, use relevant DWG file available from Hatteland Display AS

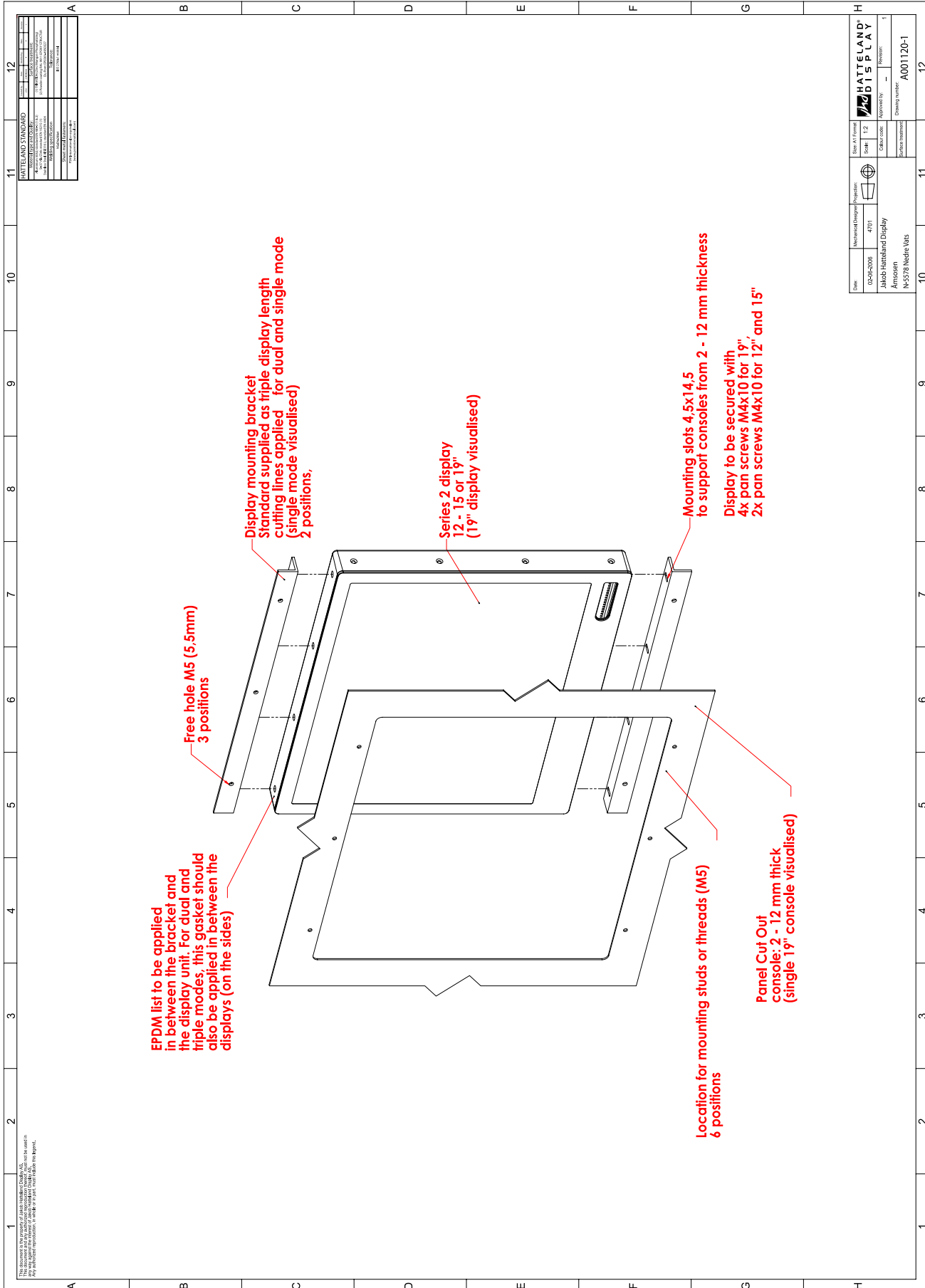


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Technical Drawings - HD xxTBR CMB-A1

Available in 1,2 and 3 cut pieces.

Dimensions might be shown with or without decimals. Tolerance on drawings is +/- 1mm. For accurate measurements, use relevant DWG file available from Hatteland Display AS

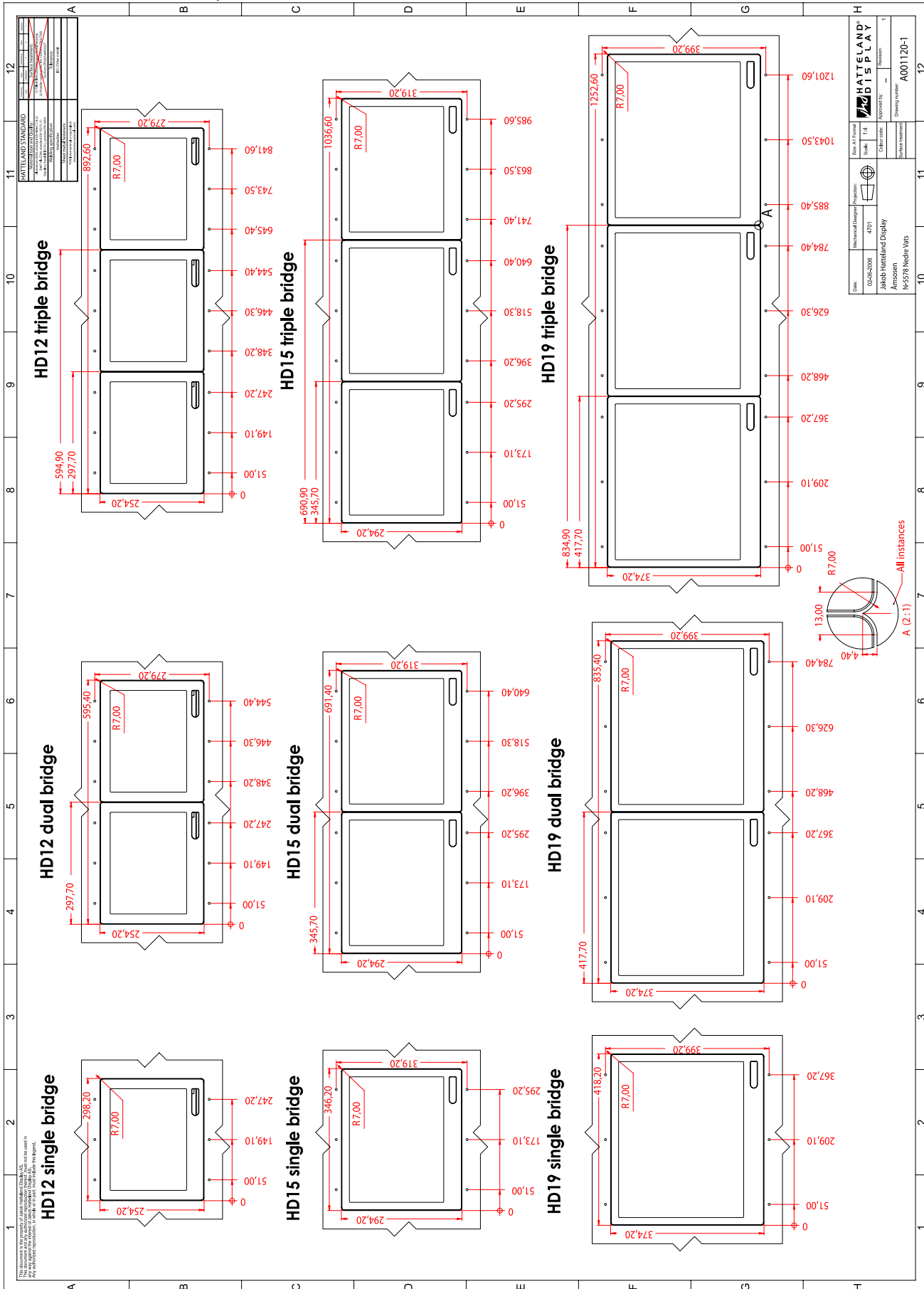


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Technical Drawings - HD xxTBR CMB-A1

Available in 1,2 and 3 cut pieces.

Dimensions might be shown with or without decimals. Tolerance on drawings is +/- 1mm. For accurate measurements, use relevant DWG file available from Hatteland Display AS



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Specifications - Serial Split Cable

Manufacturer : **Hatteland Display AS**
 Product : **DB9 Split Cable Male-Female+Female**
 Description : COM1 RS422/485 Serial Control Interface Accessory
 Part Number : **VSD100507-1**

ACCESSORY

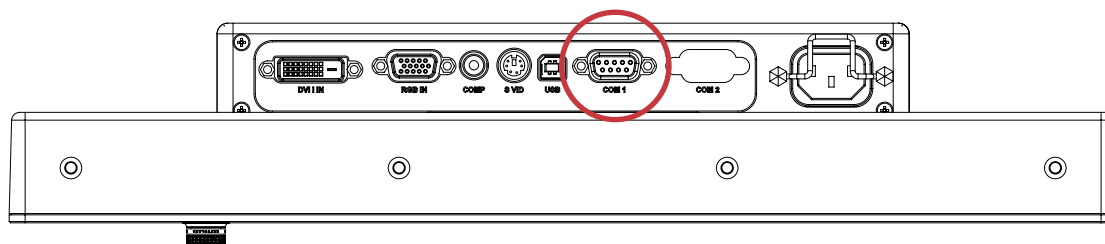
Last Revised: **14 Mar 2006**
 Revision#: **1**

DB9 Split Cable Male-Female+Female

Overview:

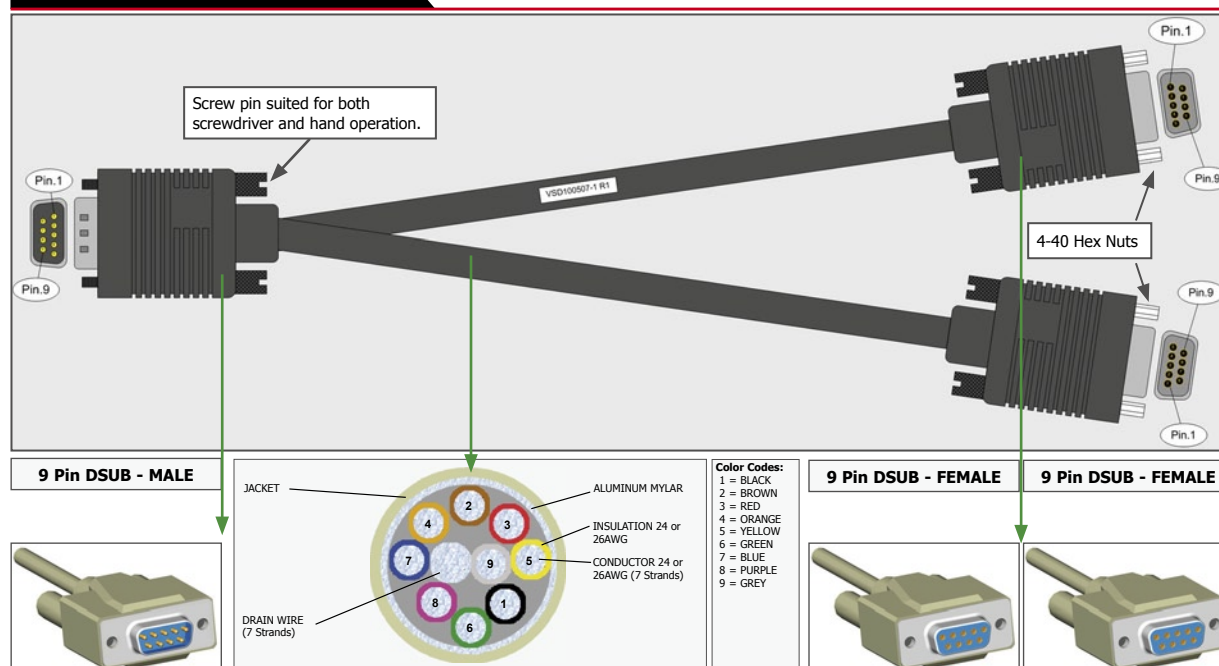
Note: All specifications are subject to change without prior notice!

The split cable is required for RS422/485 control of daisy-chained HATTELAND® Series 2 MMD displays.



Part Number	Type (Connectors)	Length	Included in standard delivery?
VSD100507-1	DB9 Split Cable Male-Female+Female	300 +/- 20mm	NO

Illustration:



Pin Assignments:

PIN (MALE)		PIN (FEMALE 1)	PIN (FEMALE 2)
1	< - >	1	1
2	< - >	2	2
3	< - >	3	3
4	< - >	4	4
5	< - >	5	5
6	< - >	6	6
7	< - >	7	7
8	< - >	8	8
9	< - >	9	9

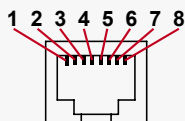
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Appendixes

Pin Assignments - Common Connectors

Note: Not all connectors may be available on your specific product. This depends on the amount of additional hardware installed from factory, or customized solutions. These pin assignments are for the common connectors used. **Connectors are seen from users Point Of View (POV).**

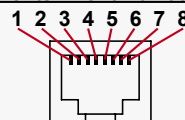
Pin Assignments - RJ45 10/100 LAN



Pin 01 - TDP	Transmit Differential Pair (Positive)
Pin 02 - TDN	Transmit Differential Pair (Negative)
Pin 03 - RDP	Receive Differential Pair (Positive)
Pin 04 - NC	Not Connected
Pin 05 - NC	Not Connected
Pin 06 - RDN	Receive Differential Pair (Negative)
Pin 07 - NC	Not Connected
Pin 08 - NC	Not Connected

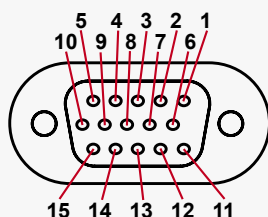
Use category 5 - twisted pair cable

Pin Assignments - RJ45 10/100/1000 GBLAN



Pin 01 - D0P	Differential Pair 0 (Positive)
Pin 02 - D0N	Differential Pair 0 (Negative)
Pin 03 - D1P	Differential Pair 1 (Positive)
Pin 04 - D2P	Differential Pair 2 (Positive)
Pin 05 - D2N	Differential Pair 2 (Negative)
Pin 06 - D1N	Differential Pair 1 (Negative)
Pin 07 - D3P	Differential Pair 3 (Positive)
Pin 08 - D3N	Differential Pair 3 (Negative)

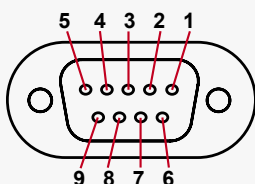
Pin Assignments - 15P HD RGB VGA



Pin 01	Red, analog
Pin 02	Green, analog
Pin 03	Blue, analog
Pin 04	Reserved for monitor ID bit 2 (grounded)
Pin 05	Digital ground
Pin 06	Analog ground red
Pin 07	Analog ground green
Pin 08	Analog ground blue
Pin 09	+5V power supply for DDC (optional)
Pin 10	Digital ground
Pin 11	Reserved for monitor ID bit 0 (grounded)
Pin 12	DDC serial data
Pin 13	Horizontal sync or composite sync, input
Pin 14	Vertical sync, input
Pin 15	DDC serial clock

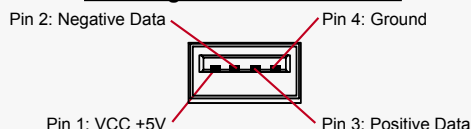
Pin Assignments - 9P Serial COM RS232

This connector is commonly used for:
Serial Remote Control Interface (SCOM) and
Touch Screen communication.



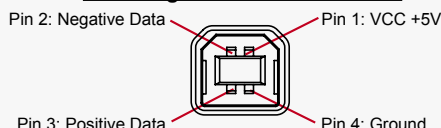
Pin 01 - DCD	Data Carry Detect
Pin 02 - SIN	Serial In or Receive Data
Pin 03 - SOUT	Serial Out or Transmit Data
Pin 04 - DTR	Data Terminal Ready
Pin 05 - GND	Ground
Pin 06 - DSR	Data Set Ready
Pin 07 - RTS	Request To Send
Pin 08 - CTS	Clear To Send
Pin 09 - RI	Ring Indicate

Pin Assignments - USB TYPE A



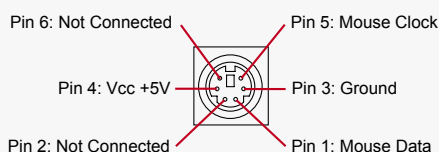
Pin 2: Negative Data	Pin 4: Ground
Pin 1: VCC +5V	Pin 3: Positive Data

Pin Assignments - USB TYPE B



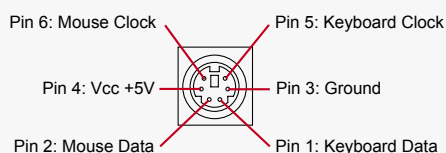
Pin 2: Negative Data	Pin 1: VCC +5V
Pin 3: Positive Data	Pin 4: Ground

Pin Assignments - 5P PS/2 MOUSE



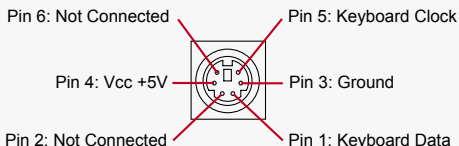
Pin 6: Not Connected	Pin 5: Mouse Clock
Pin 4: Vcc +5V	Pin 3: Ground
Pin 2: Not Connected	Pin 1: Mouse Data

Pin Ass. - 5P PS/2 KEYBOARD+MOUSE Combined



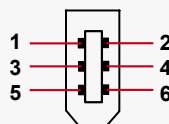
Pin 6: Mouse Clock	Pin 5: Keyboard Clock
Pin 4: Vcc +5V	Pin 3: Ground
Pin 2: Mouse Data	Pin 1: Keyboard Data

Pin Assignments - 5P PS/2 KEYBOARD



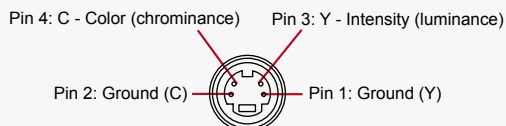
Pin 6: Not Connected	Pin 5: Keyboard Clock
Pin 4: Vcc +5V	Pin 3: Ground
Pin 2: Not Connected	Pin 1: Keyboard Data

Pin Assignments - FIREWIRE IEEE-1394



Pin 01 - VCC	Power
Pin 02 - GND	Grounding for power and inner cable shield
Pin 03 - TPB-	Twisted Pair B- Receive Strobe, Transmit Data
Pin 04 - TPB+	Twisted Pair B+ Receive Strobe, Transmit Data
Pin 05 - TPA-	Twisted Pair A- Transmit Strobe, Receive Data
Pin 06 - TPA+	Twisted Pair A+ Transmit Strobe, Receive Data

Pin Assignments - 5P S-VHS/S-VIDEO



Pin 4: C - Color (chrominance)	Pin 3: Y - Intensity (luminance)
Pin 2: Ground (C)	Pin 1: Ground (Y)

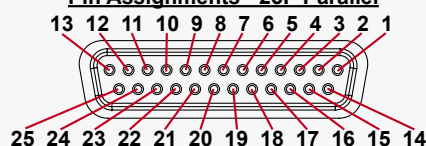
Pin Assignments - RCA/BNC 1P COMP. VIDEO



Pin 1: Video Signal	Ground Shield
---------------------	---------------

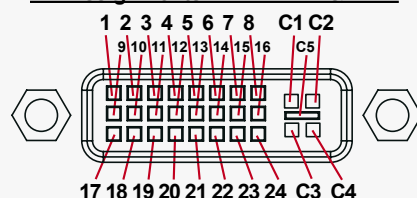
Pin Assignments - Common Connectors

Pin Assignments - 25P Parallel



Pin 01 - STROBE	This signal indicates to the printer that data at PD7..0 are valid.
Pin 02 - DATA0	Parallel data bus from PC board to printer. The data line are able to operate in PS/2 compatible bi-directional mode.
Pin 03 - DATA1	Same as Pin 02
Pin 04 - DATA2	Same as Pin 02
Pin 05 - DATA3	Same as Pin 02
Pin 06 - DATA4	Same as Pin 02
Pin 07 - DATA5	Same as Pin 02
Pin 08 - DATA6	Same as Pin 02
Pin 09 - DATA7	Same as Pin 02
Pin 10 - ACK	Signal from printer indicating that the printer has received the data and is ready to accept further data.
Pin 11 - BUSY	Signal from printer indicating that the printer cannot accept further data.
Pin 12 - PE	Signal from printer indicating that the printer is out of paper.
Pin 13 - SELECT	Signal from printer to indicate that the printer is selected.
Pin 14 - AUTO FEED	This active low output causes the printer to add a line feed after each line printed.
Pin 15 - ERR#	Signal from printer indicating that an error has been detected.
Pin 16 - INIT#	This active low output initialises (resets) the printer.
Pin 17 - SLIN#	Signal to select the printer sent from CPU board to printer.
Pin 18 - GND	Ground
Pin 19 - GND	Ground
Pin 20 - GND	Ground
Pin 21 - GND	Ground
Pin 22 - GND	Ground
Pin 23 - GND	Ground
Pin 24 - GND	Ground
Pin 25 - GND	Ground

Pin Assignments - 24P DVI-D & DVI-I



Pin 01	T.M.D.S. Data2 - (Digital - RED link 1)
Pin 02	T.M.D.S. Data2 + (Digital + RED link 1)
Pin 03	T.M.D.S. Data2/4 Shield
Pin 04	T.M.D.S. Data4 - (Digital - GREEN link 2)
Pin 05	T.M.D.S. Data4 + (Digital + GREEN link 2)
Pin 06	DDC Clock
Pin 07	DDC Data
Pin 08	Analog Vertical Sync (DVI-I only)
Pin 09	T.M.D.S. Data1 - (Digital - GREEN link 1)
Pin 10	T.M.D.S. Data1 + (Digital + GREEN link 1)
Pin 11	T.M.D.S. Data1/3 Shield
Pin 12	T.M.D.S. Data3 - (Digital - BLUE link 2)
Pin 13	T.M.D.S. Data3 + (Digital + BLUE link 2)
Pin 14	+5V Power (for standby mode)
Pin 15	Ground (for +5V and analog sync)
Pin 16	Hot Plug Detect
Pin 17	T.M.D.S. Data0 - (Digital - BLUE link 1) and digital sync.
Pin 18	T.M.D.S. Data0 + (Digital + BLUE link 1) and digital sync.
Pin 19	T.M.D.S. Data0/5 Shield
Pin 20	T.M.D.S. Data5 - (Digital - RED link 2)
Pin 21	T.M.D.S. Data5 + (Digital + RED link 2)
Pin 22	T.M.D.S. Clock Shield
Pin 23	T.M.D.S. Clock + (Digital clock + (Links 1 and 2)
Pin 24	T.M.D.S. Clock - (Digital clock - (Links 1 and 2)
Pin C1	Analog RED
Pin C2	Analog GREEN
Pin C3	Analog BLUE
Pin C4	Analog Horizontal Sync.
Pin C5	Analog Ground (return for RGB signals)

DDC = Display Data Channel /// T.M.D.S = Transition Minimized Differential Signal /// PIN C1,C2,C3,C4 = Only present on DVI-I connectors.

Additional connector pinouts may be available in third party motherboard manuals, primarily for computers only. Please see manual/drivercd delivered with your product.

Preset Signal Timings

Mode	Resolution	Clk [MHz]	Horizontal freq [KHz]	Vertical freq [Hz]	Sync Mode
E1_70	640x350	25.175	31.469	70	Digital Separate Sync
E1_70	640x350	25.175	31.469	70	Sync On Green (with or without serrate pulse)
E1_70	640x350	25.175	31.469	70	Composite Sync (with or without serrate pulse)
E1_85	640x350	31.500	37.861	85	Digital Separate Sync
E1_85	640x350	31.500	37.861	85	Sync On Green (with or without serrate pulse)
E1_85	640x350	31.500	37.861	85	Composite Sync (with or without serrate pulse)
E2_70	640x400	25.175	31.469	70	Digital Separate Sync
E2_70	640x400	25.175	31.469	70	Sync On Green (with or without serrate pulse)
E2_70	640x400	25.175	31.469	70	Composite Sync (with or without serrate pulse)
E2_85	640x400	31.500	37.861	85	Digital Separate Sync
E2_85	640x400	31.500	37.861	85	Sync On Green (with or without serrate pulse)
E2_85	640x400	31.500	37.861	85	Composite Sync (with or without serrate pulse)
T_70	720x400	28.322	31.469	70	Digital Separate Sync
T_70	720x400	28.322	31.469	70	Sync On Green (with or without serrate pulse)
T_70	720x400	28.322	31.469	70	Composite Sync (with or without serrate pulse)
T_85	720x400	35.500	37.927	85	Digital Separate Sync
T_85	720x400	35.500	37.927	85	Sync On Green (with or without serrate pulse)
T_85	720x400	35.500	37.927	85	Composite Sync (with or without serrate pulse)
V_62	736x480	28.200	31.403	62	Digital Separate Sync
V_62	736x480	28.200	31.403	62	Sync On Green (with or without serrate pulse)
V_62	736x480	28.200	31.403	62	Composite Sync (with or without serrate pulse)
V_60	640x480	25.175	31.469	60	Digital Separate Sync
V_60	640x480	25.175	31.469	60	Sync On Green (with or without serrate pulse)
V_60	640x480	25.175	31.469	60	Composite Sync (with or without serrate pulse)
V_67	640x480	31.500	37.500	67	Digital Separate Sync
V_67	640x480	31.500	37.500	67	Sync On Green (with or without serrate pulse)
V_67	640x480	31.500	37.500	67	Composite Sync (with or without serrate pulse)
V_72	640x480	31.500	37.861	72	Digital Separate Sync
V_72	640x480	31.500	37.861	72	Sync On Green (with or without serrate pulse)
V_72	640x480	31.500	37.861	72	Composite Sync (with or without serrate pulse)
V_75	640x480	31.500	37.500	75	Digital Separate Sync
V_75	640x480	31.500	37.500	75	Sync On Green (with or without serrate pulse)
V_75	640x480	31.500	37.500	75	Composite Sync (with or without serrate pulse)
V_85	640x480	36.000	43.269	85	Digital Separate Sync
V_85	640x480	36.000	43.269	85	Sync On Green (with or without serrate pulse)
V_85	640x480	36.000	43.269	85	Composite Sync (with or without serrate pulse)
SV_56	800x600	36.000	35.156	56	Digital Separate Sync
SV_56	800x600	36.000	35.156	56	Sync On Green (with or without serrate pulse)
SV_56	800x600	36.000	35.156	56	Composite Sync (with or without serrate pulse)
SV_60	800x600	40.000	37.879	60	Digital Separate Sync
SV_60	800x600	40.000	37.879	60	Sync On Green (with or without serrate pulse)
SV_60	800x600	40.000	37.879	60	Composite Sync (with or without serrate pulse)
SV_72	800x600	50.000	48.077	72	Digital Separate Sync
SV_72	800x600	50.000	48.077	72	Sync On Green (with or without serrate pulse)
SV_72	800x600	50.000	48.077	72	Composite Sync (with or without serrate pulse)
SV_75	800x600	49.500	46.875	75	Digital Separate Sync
SV_75	800x600	49.500	46.875	75	Sync On Green (with or without serrate pulse)
SV_75	800x600	49.500	46.875	75	Composite Sync (with or without serrate pulse)
SV_85	800x600	56.250	53.674	85	Digital Separate Sync
SV_85	800x600	56.250	53.674	85	Sync On Green (with or without serrate pulse)
SV_85	800x600	56.250	53.674	85	Composite Sync (with or without serrate pulse)
X_60	1024x768	65.000	48.363	60	Digital Separate Sync

Preset Signal Timings

X_60	1024x768	65.000	48.363	60	Sync On Green (with or without serrate pulse)
X_60	1024x768	65.000	48.363	60	Composite Sync (with or without serrate pulse)
X_70	1024x768	75.000	56.476	70	Digital Separate Sync
X_70	1024x768	75.000	56.476	70	Sync On Green (with or without serrate pulse)
X_70	1024x768	75.000	56.476	70	Composite Sync (with or without serrate pulse)
X_72	1024x768	75.000	57.515	72	Digital Separate Sync
X_72	1024x768	75.000	57.515	72	Sync On Green (with or without serrate pulse)
X_72	1024x768	75.000	57.515	72	Composite Sync (with or without serrate pulse)
X_75	1024x768	78.750	60.023	75	Digital Separate Sync
X_75	1024x768	78.750	60.023	75	Sync On Green (with or without serrate pulse)
X_75	1024x768	78.750	60.023	75	Composite Sync (with or without serrate pulse)
X_87i	1024x768 43Hz Interaced	44.900	35.522	87	Digital Separate Sync
X_87i	1024x768 43Hz Interaced	44.900	35.522	87	Sync On Green (with or without serrate pulse)
X_87i	1024x768 43Hz Interaced	44.900	35.522	87	Composite Sync (with or without serrate pulse)
X_85	1024x768	94.500	68.677	85	Digital Separate Sync
X_85	1024x768	94.500	68.677	85	Sync On Green (with or without serrate pulse)
X_85	1024x768	94.500	68.677	85	Composite Sync (with or without serrate pulse)
SX_60	1280x1024	108.000	63.981	60	Digital Separate Sync
SX_60	1280x1024	108.000	63.981	60	Sync On Green (with or without serrate pulse)
SX_60	1280x1024	108.000	63.981	60	Composite Sync (with or without serrate pulse)
SX_72	1280x1024	135.000	78.125	72	Digital Separate Sync
SX_72	1280x1024	135.000	78.125	72	Sync On Green (with or without serrate pulse)
SX_72	1280x1024	135.000	78.125	72	Composite Sync (with or without serrate pulse)
SX_75	1280x1024	135.000	79.976	75	Digital Separate Sync
SX_75	1280x1024	135.000	79.976	75	Sync On Green (with or without serrate pulse)
SX_75	1280x1024	135.000	79.976	75	Composite Sync (with or without serrate pulse)
UX_60	1600x1200	112.288	75.000	60	Digital Separate Sync
UX_60	1600x1200	112.288	75.000	60	Sync On Green (with or without serrate pulse)
UX_60	1600x1200	112.288	75.000	60	Composite Sync (with or without serrate pulse)
NTSC S Video	---	14.318	15.734	60	---
PAL S-Video	---	17.75	15.625	50	---
NTSC Composite Video	---	14.318	15.734	60	---
PAL Composite Video	---	17.75	15.625	50	---

Basic Trouble-shooting

COMMON ERRORS: (This is a generic description of possible issues for a variety of products)

If for some reason there should be something wrong with the picture quality or no picture present, check the symptoms carefully and try to cure it with the hints below:

NO PICTURE / LED BEHAVIOUR:

If there is no light at all in the LED at the FRONT, check power cables. If the LED in front is green then check if the brightness knob is turned to the right (max brightness). If still no picture, check if there is a VGA signal on the External VGA connector. If you have a picture on the external VGA connector please look in BIOS documentation/chapter for correct display settings in BIOS. Lack of image is most likely to be caused by incorrect connection, lack of power, or wrong BIOS settings.

SCROLLING / UNSTABLE IMAGE:

Signal cable may not be completely connected to computer or TFT display. Check the pin assignments and signal timings of the display and your video card with respect to recommended timing and pin assignments. Make sure that the video card is compatible and that it is properly seated / installed on the computer.

DISPLAY AREA IS NOT CENTERED / SIZED CORRECTLY

Make sure that a supported video mode has been selected on the display, or on the video card / system. If it is impossible to position the image correctly, i.e. the image adjustment controls will not move the image far enough, then test it again using another graphics card for the PC system. This situation may occur with a custom graphics card that is not close to standard timings or if something is in the graphics line that may be affecting the signal, such as a signal splitter (please note that normally a signal splitter will not have any adverse effect). If it is impossible to change to the correct resolution/color depth, check if you have the right VGA driver installed in your system.

IMAGE APPEARANCE:

A faulty TFT panel can have black lines, pixel errors, failed sections, flickering or flashing image. Incorrect graphics card refresh rate, resolution or interlaced mode will probably cause the image to be the wrong size, it may scroll, flicker badly or possibly even no image is present. Sparkling on the display may be a faulty TFT panel signal cable, and it needs service attention.

RGB Signal Only:

Horizontal interference can usually be corrected by adjusting the PHASE (OSD menu).

Vertical interference can usually be corrected by adjusting the FREQUENCY (OSD menu).

DEW CONDENSATION BEHIND GLASS:

Note that this problem will not occur on bonded products. For non-bonded products, do the following: Power on the TFT product and set brightness to 100%. Turn off any automatic screensavers on PC or similar. During minutes the dew will be gone. To speed up the process, use a fan heater for a reasonable time. Do not overheat the TFT product.

CD-ROM FAILURE OR READ/DETECTION PROBLEMS:

If the product are operated/located in a area with extreme condensation, the CD/DVD drive may not work correctly due to condensation on the read head. Keep the product on for a while until it's reached normal operating temperature, and retry accessing discs. Otherwise, consider using USB memory sticks or alternative storage devices.

NO CD-ROM AVAILABLE ON YOUR PRODUCT FOR INSTALLING DRIVERS/SOFTWARE:

Please use USB memory sticks, USB Floppy drive, USB CD-Rom Drive or alternative storage devices to transfer/install software on CD-ROM-less units.

HATTELAND® DISPLAY

Declaration of Conformity

We, manufacturer

Hatteland Display AS

Åmsosen, N-5578 Nedre Vats, Norway


declare under our sole responsibility that the
JH MMD, JH MMC, JH STD, JH MIL, HT STD (Series 1)
and HD MMD, HT MMC (Series 2) products is
in conformity with the following standards in
accordance with the EMC Directive.

EN 55022 Class A - Emission

EN 55024 - Immunity

Signature: 

Frode Grindheim
VP Technical Support Division
Nedre Vats

Signature: 

Arne Kristiansen
Site Manager - Test & Commission Division
Oslo

Date: 22 January 2007



Return Of Goods Information

Return of goods: (Applies not to warranty/normal service/repair of products)

Hatteland Display referenced as "manufacturer" in this document.

Before returning goods, please contact your system supplier before sending anything directly to manufacturer. When you return products after loan, test, evaluation or products subject for credit, you must ensure that all accessories received from our warehouse is returned. This applies to cables, powermodules and additional equipment except screws or similar, user manual, datasheets or other written paper documents. Furthermore, the product must not have any minor / medium or severe scratches, chemical spills or similar on the backcover, front frame or glass.

This is needed to credit the invoice 100%. Missing parts will not be subject for credit, and you will not get total credit for returned product. You will either be charged separately or the amount is withdrawn from the credit. If you decide to ship the missing items on the after hand, you will get 100% credit for that particular invoice or items received at manufacturer incoming goods control. Please contact our service/sales department if additional questions.

Current prices apply as per May 2004:

Signal Cable DSUB 15P Male or Female - Approx 1,8meters	Price: 170,- NOK each
Signal Cable BNC 5P - Approx 1,8meters	Price: 350,- NOK each
RS-232 serial cable DSUB 9P - Approx 1,8meters	Price: 80,- NOK each
Powercable 110 / 220 VAC (European or US standard) - Approx 1,8meters	Price: 50,- NOK each
Minor / Medium or severe scratches / chemical spill on backcover	Price: 1300,- NOK
Any scratch, chemical spill or similar on front frame (including glass)	Price: 2000,- NOK

(Prices are approx, and any deviation are evaluated during incoming goods control)

Approved packaging methods/materials: (Applies to all shipments to manufacturer)

When returning goods, please make sure you surround the product with the following material, whenever possible: Original packaging from manufacturer, firm foam material, bubble wrap or lots of PadPack paper or Foam chips/polyester wrapped in sealed plastic bags. In any case, always use a solid cardboard box to surround everything.

Not approved packaging methods/materials are: Foam chips, expanded polyester, clothes, nothing, or too little, or anything that will crumble and get into the ventilation holes of products and cardboard boxes that are not suitable to secure the product during shipment.

Terms

Terms Of Sale And Delivery

1) APPLICATION

The terms of sale and delivery apply for Hatteland Display.

2) PRICE

- a) The price is per each, if nothing else has been stated, VAT not included. Price is based on the prices from our suppliers, current custom rates, taxes, rate of exchange and international raw material prices. We reserve ourselves the rights to adjustments in case of alternation on the above mentioned.
- b) Included in the price is the supplier's standard packing. In case of re-packing/smaller quantities we reserve ourselves the right to add an additional sum for warrantable packing according to CECC 0015 (Basic inspection for protection of electrostatic sensitive devices)

3) VALIDITY

If nothing else has been stated in our quotation, the offer is valid for 30 days from the date of quotation.

4) PACKAGE QUOTATION

A package quotation means that all the components offered, must be ordered by us. If one component or more are removed from the quotation, the prices given in the package quotation are not valid.

5) TERMS OF PAYMENT

Cash on delivery or payment in advance. Net granted for companies, schools and institutions only, according to agreement. In case of too late payment 1.5% interest/month will be charged. Seller has mortgage rights in the goods delivered until the purchase price, additional interests and charges have been paid in full. Accepted bill is not considered as payment until it has been honoured in full.

6) TIME OF DELIVERY

The quoted time of delivery is based on information from our suppliers. We disclaim any responsibility for the consequences of any delay or cancellation from our suppliers. Belated delivery gives not solely the right for cancellation.

7) DELIVERY POINT OF TIME

Goods are considered delivered to customer when handed over to charterer.

8) FREIGHT / PACKING / FORWARDING FEE

Hatteland Display AS charge NOK 50,- in forwarding fee for orders below NOK 1000,-.
Freight charge according to expenses for orders above NOK 1000,-. VAT not included.

9) COMPLAINT

By receipt customer must check goods for obvious defects which have to be claimed within 8 days from receipt. Otherwise acceptance of complaint can not be counted on.

10) GUARANTEE / SERVICES

Time of guarantee is calculated from our date of shipment, and applies to the extent that we are covered by our supplier's guarantee regulations. The guarantee does no longer apply if:

- I) there has been encroached upon the goods without seller's consent
- II) terms of payment is not fulfilled
- III) the goods have been damaged due to unskilled treatment
- IV) components which are sensitive for static electricity have not been unpacked and treated in a secure way.

Minimum requirements: CECC 00015's standards for handling of such components. The guarantee does not include fair wear and tear.

11) RESPONSIBILITY

Seller undertake to deliver faultless and functional capable goods according to existing technical specifications. Seller disclaim responsibility for any damage or loss which directly or indirectly may be caused due to failure or defect with the delivered goods, if carelessness from the seller can be limited up to the cost of the goods. The supplier's responsibility for defects with the supplied goods do not include secondary damage or loss.

Terms

12) CANCELLATION / RETURN

Binding sales contract is concluded when we have confirmed customer's purchase order. Any disagreements in our order confirmation must be reported to seller within 6 days. The agreement can not be altered without our permission, after acceptance from our supplier. If goods are wanted to be returned, a Return No must be assigned from seller. Returned goods without a Return No will not be accepted. By return of stock listed goods, 20% return fee is charged. Returned goods are shipped on customer's account and risk.

13) LOAN, RENT and DEMO

When borrowing of goods for demo/test, the date of return must be added to the document. If no date has been stated, date of return is two weeks from the date of the document. Before return, seller must be contacted for a Return No (RTK). Goods which have been sold with an agreed right of return within stated terms, shall also have a Return No. The Return No must be obtained before the stated date of return. Returned goods without a Return No, or which have not been packed in original packing, will not be accepted.

14) LIMITATIONS

If any of our suppliers claim limited delivery terms towards us, our terms of delivery will be restricted according to those.

15) SOFTWARE

Sold or borrowed software is not allowed to be copied or spread in other ways, without a written permission.

16) RE-EXPORT

Goods delivered from seller may be subject to special rules of exportation in their supplier's native country. Buyer is responsible to obtain necessary permissions for further export/re-sale.

17) QUESTION IN DISPUTE

To settle any dispute the Karmsund Herredsrett is approved the legal venue.

INSTRUCTIONS FOR THE CONSIGNEE

1) CONTROL

Control the goods immediately by receipt. Examine the quantity towards the invoice/packinglist/shipping documents. Look for outward defects on the packing which may indicate damage on or loss of contents. Control the container and the seals for any defects.

2) SECURING EVIDENCE

When defects on the goods have been found, evidence must be secured, and seller must be informed. Call the transporter and point out the defects. Add a description of the defects on the goods receipt, the forwarder's copy of the way-bill or on the driving slip.

3) RESCUE

Bound the damage. Try to restrict the damage and the loss. Seller will compensate expenses incurred due to reasonable security efforts in addition to damage and loss.

4) COMPLAINT

Write immediately a complaint to the transporter or his agent. Forward immediately the complaint to the transporter or his agent, and hold the transporter responsible for the defects. The complaint must be sent at the latest:

- for carriage by sea: within 3 days
- for overland / air transportation within 7 days

5) DOCUMENTATION

For any claims the following documentation is required, and must be forwarded to the company or their agent: invoice, way-bill and/or bill of landing, and/or statement of arrival, inspection document, besides a copy of the letter of complaint to the transporter.

Pixel Defect Policy

PIXEL DEFECT POLICY

Dot-defects (Bright or dark spots on the panel)

Due to the effect that dot failures are part of the TFT technology such failure occurrence cannot be prevented basically. Even though dot defects usually occur during production process, new defects can appear within the lifespan of a TFT display. Neither the production at LCD-supplier nor the use of a LCD-Monitor after shipment can be influenced by Hatteland Display. Hence Hatteland Display cannot be made responsible for such dot failures. However Hatteland Display understand and accepts the responsibility towards the customers for the delivery of new displays, therefore accepts a limitation on dot defect's occurrence on new displays delivered to the customer.

PRINCIPLES

- a. One pixel consists of 3 dots (Red, Green and Blue)
- b. Dot defects are differentiated between:
 - Bright dot defects: Spot on the panel appear as pixels or sub pixels that are always lit. Non-extinguishing dot.
 - Dark dot defects: Spot on the panel appear as pixels or sub pixels that are always dark (off). Non-lightening dot.
- c. Inspector observes the LCD from normal direction at a distance of 50cm above the worktable. Dark dots are counted under entire white screen. Bright dots are counted under entire black screen.
- d. Dot failures within tolerances below do not qualify for warranty claims.

PIXEL DEFECT TOLERANCES

Bright dot	≤ 4 dots
Two adjacent bright dots *	≤ 2
Distance between 2 dot defects *	$\geq 15\text{mm}$
Dark dots	≤ 8
Total number of bright or dark dot defects. *	≤ 8

* 1 or 2 adjacent dot defects considered as 1 defect.

EXTRAORDINARY CIRCUMSTANCES

Possible cases which cannot be influenced either by customer or Hatteland Display.

Examples for extraordinary circumstances:

- Allocation from LCD-Supplier
- Outstanding high number of LCD-panels with bright dots but within LCD-suppliers Specification.
- Sharply increased demand by customer

In such cases a mutual agreement is inevitable.

Examples:

- Acceptance of bright dots in "non-critical" display areas.
- Acceptance of bright dots with defined color.

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Notes

General Notes:

- The unit is type approved according to EN60945 (1997), 4.4, equipment category b) protected from the weather.
- Use of brightness and push buttons may inhibit visibility of information at night.
- Other type approvals applies for the different products.
Please see **Testing & Approvals Overview** section in this manual for more information.

Display Firmware Version

To verify, the version number is displayed in the UTILITIES menu in the right top corner.

This manual currently applies for these BIOS Firmware Versions:
2V6F and above.

Safety Considerations

To prevent heat to build up inside the display we recommend installing the unit in a vertical position +/- 40 degrees maximum. We also recommend adding forced cooling in applications where;

- Vertical mounting angle is above +/- 40 degrees
- Operating temperature is above 25C
- Ventilation area around unit is restricted.

Fans should be mounted to enhance natural airflow directed upwards through the unit.

Notes

Revision History

Rev.	By	Date	Notes
1	SE	04 May 06	First release, User Manual for Display Module and MMD2 backpack.
2	SE	12 Sep 06	Revised specifications and added touch screen chapter. Revised general incorrect text where needed. Type approval page removed, and information merged with the respective product specification pages.
3	SE	29 Jan 07	Minor text changes. Revised OS S/N Sticker location on backpack. Moved from underside to beside JHD S/N label.
4	SE	28 Feb 07	Minor text changes, and specifications updated. Added drawings for VESA Bracket accessory. Added specifications on Serial Split Cable accessory.
5	SE	15 Mar 07	Specifications and technical drawing now cover all BOxx and COxx models available. BOAA, BOBA, BOAC, BOBC (Bracket models) and COAA, COBA, COAC, COBC (Console models).
6	SE	18 Jul 07	Specifications revised. Installation chapter revised. Added Technical Drawings for Console Mounting Bracket (CMB) accessory. Revised general text elements where needed. Prepared pages for FOxx models (Flange).
7	SE	24 Sep 07	Revised information about available Serial Remote Control Interface (SCOM) operation in the Operation chapter.
8	SE JB JS TØ	24 Oct 07	Specifications revised (ABS & GL type approved) where applicable. Added pixel defect policy section. Revised installation chapter (cleaning of glass and installation precaution for glass edges/panel cut-out) Added FOxx (flange) models with drawings and specifications.
9	SE AK	22 Nov 07	Specifications revised (ClassNK type approved) where applicable. Added note about touch screen products not type approved on specification pages

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